Long Range Transportation Plan

2045

SD DEPARTMENT OF TRANSPORTATION

U.S. Department of Transportation Federal Highway Administration

Federal Transit Administration

Prepared by:

South Dakota Department of Transportation
Project Development Office

In cooperation with
United States Department of Transportation
Federal Highway Administration
And
Federal Transit Administration

August 2021

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The preparation of this report has been financed in part through grant(s) from the Federal Highway Administration and Federal Transit Administration, U.S. Department of Transportation, under the State Planning and Research Program, Section 505 [or Metropolitan Planning Program, Section 104(f)] of Title 23, U.S. Code. The contents of this report do not necessarily reflect the official views or policy of the U.S. Department of Transportation.

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Acronyms and Abbreviations

ADA	Americans with Disabilities Act
ADT	Average Daily Travel
AT	Active Transportation
BIA	Bureau of Indian Affairs
BNSF	Burlington Northern Santa Fe Railroad
CIP	Capital Improvement Program
DANR	SD Department of Agriculture and Natural Resources
FAST Act	Fixing America's Surface Transportation Act
FHWA	Federal Highway Administration
FTA	Federal Transit Authority
GDP	Gross Domestic Product
GFP	Game, Fish, and Parks
GIS	Geographic Information System
GPS	Global Positioning System
IRI	International Roughness Index
ITS	Intelligent Transportation System
LiDAR	Light Detection and Ranging

LRTP	Long Range Transportation Plan
MPO	Metropolitan Planning Organization
NAICS	North American Industry Classification System
NEPA	National Environmental Policy Act
NHPF	National Highway Freight Program
NHPP	National Highway Performance Program
NHS	National Highway System
NPMRDS	National Performance Management Research Data Set
PL	Planning Funds
PTAB	Public Transit Advisory Board
RCP&E	Rapid City, Pierre, and Eastern Railroad
RITIS	Regional Integrated Transportation Information System
SAM	Sioux Area Metro
SCI	Surface Condition Index
SDDOT	South Dakota Department of Transportation
SHP	State Highway Patrol
SHSP	Strategic Highway Safety Plan
SECOG	South Eastern Council of Governments
SIMPCO	Siouxland Interstate Metropolitan Planning Council
STIP	Statewide Transportation Improvement Program
TAMP	Transportation Asset Management Plan
TAP	Transportation Alternative Program
TAZ	Traffic Analysis Zone
TERO	Tribal Employment Rights Office
TECRO	Tribal Employment and Contracting Office
THPO	Tribal Historic Preservation Office
TIP	Transportation Improvement Program
TPWP	Transportation Planning Work Program
UAZ	Urbanized Area
UPWP	Unified Planning Work Program
US	United States
VMT	Vehicle Miles Traveled

Chapter 1: Overview

Mission

South Dakota's Department of Transportation's (SDDOT) mission is "to efficiently provide a safe and effective public transportation system".

Vision

Achieve excellence in providing transportation facilities that meet the needs of the public, leading towards ***Better Lives through Better Transportation, By Being the Best***.

Goals

The goals of the South Dakota Long Range Transportation Plan (LRTP), as set forth by internal stakeholders, are to:

- Improve Transportation Safety and Security for all Modes of Transportation (2,9)
- Preserve and Maintain the Transportation System (1)
- Improve Mobility, Reliability and Accessibility (3,4,7)
- Preserve South Dakota's Quality of Life (8)
- Support Economic Growth and Development (6)
- Promote Environmental Stewardship (New)
- Promote Innovative Transportation Technologies

Purpose

The LRTP supports the SDDOT's mission, vision, and goals by providing a planning framework that guides decision-making, monitors and identifies transportation challenges and opportunities, highlights beneficial multi-modal relationships and opportunities, and ensures projects reflect fiscal and political reality through sustainable efforts. This plan serves as guidance for annual decision-making of the Statewide Transportation Improvement Program (STIP) and many other components within the agency.

In addition, the LRTP assists the development of goals, strategies, and actions considered by South Dakota's Metropolitan Planning Organizations (MPOs), Tribal governments, local governments and other public agencies, citizens, and transit providers by coordinating issues of mutual concern in an atmosphere of collaboration.

The Planning Process

The process to formulate South Dakota's LRTP is shown in Figure 1-1. The plan's development relies on input from a variety of sources. Stakeholders are comprised of members from the Transportation Commission, Aeronautics Commission, Railroad Board, Scenic Byways Committee, city governments, MPO's, counties, tribal governments, planning districts, citizens, and various federal agencies through continuous interaction. Plan Components are further described in the next section.

The LRTP Update Process

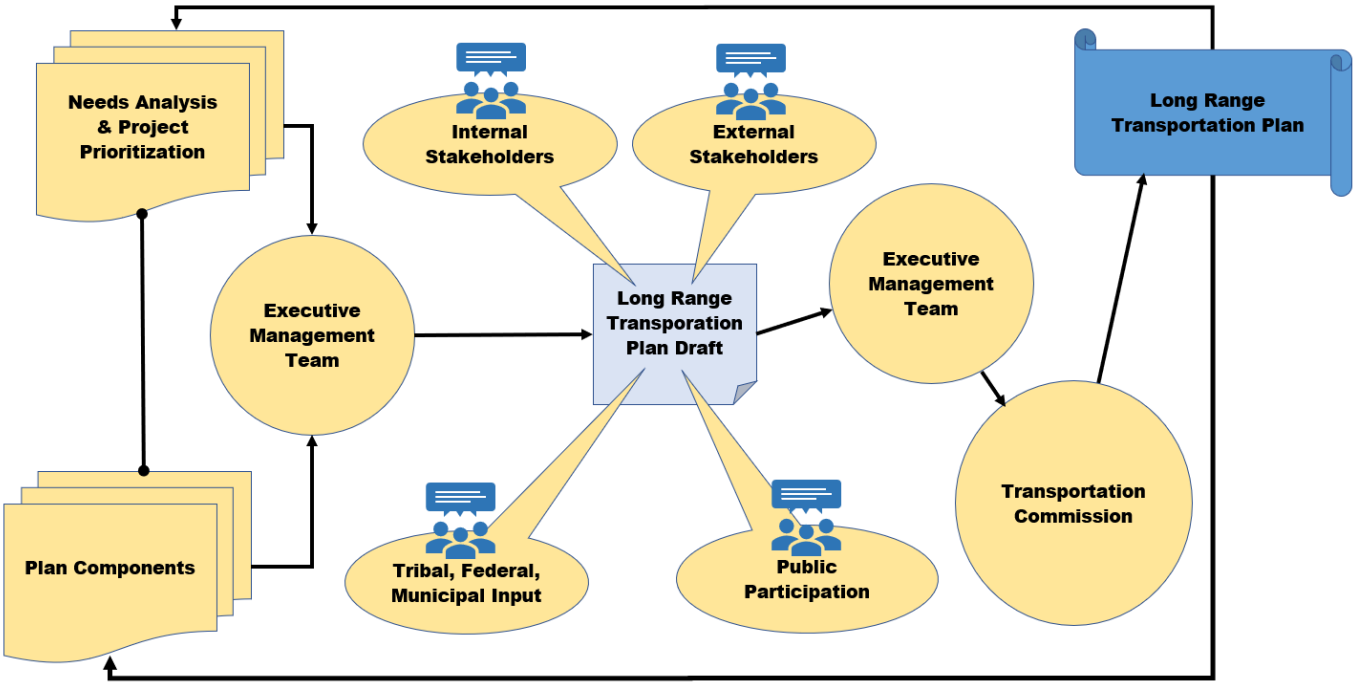


Figure 1-1

The LRTP guides the development of the STIP, which is an eight-year program listing construction projects in years 1-4 and developmental projects for years 5-8; also, long-range projects are identified beyond the developmental STIP. The construction STIP, years 1-4, represents the coordinated efforts of the SDDOT, Transportation Commission, state and federal agencies, local and tribal governments, metropolitan planning organizations, public agencies, transportation providers, elected officials, and citizens. All parties together to review projects and bring forward potential projects. The LRTP guides the development of the SDDOT's other plans and studies which effectively comprise its various components. The LRTP identifies trends and issues affecting economic development and transportation modes in South Dakota;

- Highways
- Air
- Rail
- Bicycle/Pedestrian
- Transit

Without a mandated revision period, the LRTP is updated as necessary to provide a general vision for these many components, generally on a five to ten year cycle, by following the planning process illustrated in Figure 1-2.

The LRTP Planning Process

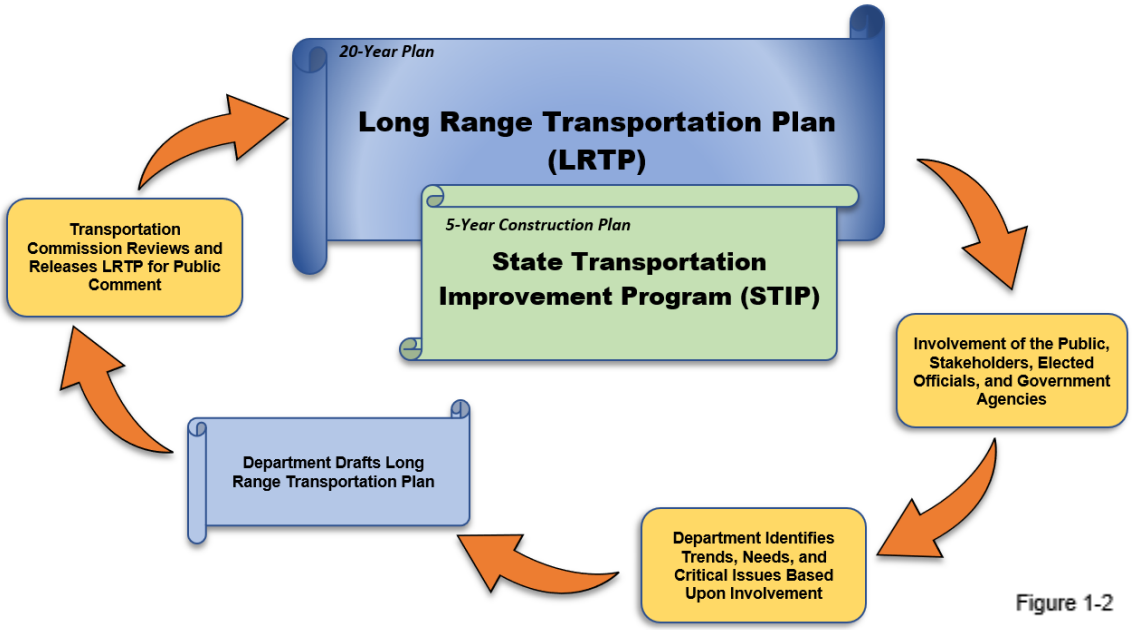


Figure 1-2

Components of the Long Range Transportation Plan

This plan provides a general outlook to identify opportunities and trends without addressing specific programmed projects. As components of the LRTP, the means to meet future conditions, consider risks, promote resiliency, and achieve annual or short-term goals are described in detail through a variety of in-depth multi-modal transportation plans, which include the following as components of the LRTP:

- SDDOT Strategic Plan;
- STIP; https://dot.sd.gov/projects-studies/planning/stip
- Transportation Asset Management Plan; https://dot.sd.gov/media/documents/SDDOT2019TAMPFHWASubmittalrevised8-28-2019.pdf

- Statewide Airport Systems Plan; https://dot.sd.gov/transportation/aviation/aviation-systems-plan#listItemLink_1605
- State Rail Plan; https://dot.sd.gov/transportation/railroads/state-rail-plan
- Strategic Highway Safety Plan; https://dot.sd.gov/media/documents/SHSP_FINAL_Reduced.pdf
- State Highway Needs Analysis; https://dot.sd.gov/projects-studies/planning/pavement-management
- Transit Asset Management (TAM) Plan; https://dot.sd.gov/media/documents/DOT-TAMPlan.pdf
- Metropolitan Planning Organizations within South Dakota;
  Rapid City Area MPO http://www.rapidcityareampo.org/
  Sioux Falls Area MPO http://siouxfallsmpo.org/
  Sioux City Area MPO https://simpco.org/divisions/transportation-planning/
- SDDOT Planning Studies; Special Studies - South Dakota Department of Transportation
- Freight Plan; https://dot.sd.gov/media/documents/SDDOTFreightPlanApproved.pdf
- Active Transportation is described in chapter 6 of this plan.

Except for the Strategic Plan, these components are inter-reliant with the LRTP and serve as derivatives of the Department's overall plan. Summaries of the multi-modal components are provided in the following section.

The South Dakota LRTP is multi-modal in nature. We look collectively at all modes of transportation by examining linkages, interactions, and movements among transportation modes through a process called multi-modalism. This process provides any mode an equal opportunity to serve the transportation need, while balancing planning considerations, public input, and financial constraints.

The SDDOT promotes multi-modal transportation. As technology progresses and needs change, new opportunities in transportation must readily be identified and incorporated into the multi-modal system for items like access to unit train grain terminals, airports, ethanol terminals and transit. Once identified, they can serve as an integrated transportation system. In addition to this plan, the other components of the LRTP function together to aid multi-modal decisions. These various other components are summarized in the following paragraphs. This plan helps ensure the process and various elements are coordinated.

- **South Dakota Department of Transportation Strategic Plan**
  The Strategic Plan sets the goals for the SDDOT. These goals are broad and general; however, the actions are tied to Performance Standards. The Strategic Plan is updated annually to allow the SDDOT to respond to

new trends. The Strategic Plan, along with the STIP, will identify the yearly decisions needed to implement the LRTP.

- **State Transportation Improvement Program (STIP)** – The STIP is an eight-year program listing construction projects in years 1-4 and developmental projects planned for years 5-8; long-range projects are also identified beyond the developmental STIP. The program identifies highway and multi-modal improvements to preserve, renovate, and enhance South Dakota's transportation system. There is an interactive map available to help interested parties locate where improvements are planned. The current STIP can be found at: Statewide Transportation Improvement Program – STIP - South Dakota Department of Transportation
- **Transportation Asset Management Plan (TAMP)** – The TAMP explains processes currently used to manage pavements and structures and describes the present condition and outlook for these important assets, updated on a 4-year cycle. The plan not only represents the SDDOT's response to federal requirements for the National Performance Management Measures, but also articulates the department's dedication to sound asset management principles and commitment of resources toward that end. The TAMP discusses how the plan's strategies integrate with other departmental efforts to achieve the national goals and foster agency resiliency. The current TAMP can be found at: https://dot.sd.gov/media/documents/SDDOT2019TAMPFHWASubmittalrevised8-28-2019.pdf
- **South Dakota Aviation System Plan** - This plan identifies and addresses the needs of the aviation industry in the state in the short-term (less than 5 years) and the long-term (20 years). The plan analyzes airport infrastructure needs, the economic impact aviation has in South Dakota, the emerging trends and technologies that impact future airport development and ways to improve the aviation system. The plan also develops capital improvement plans for every airport. The current plan can be found at: https://dot.sd.gov/transportation/aviation/aviation-systems-plan#listItemLink_1605.
- **State Rail Plan** - This plan analyzes the future of the rail system in the state. It aids in deciding which rail lines to assist, the State Rail Plan outlines several screening criteria, including evaluating the line's impact on the economy. It lays out the criteria used to determine if the rail line is essential to the rail system in South Dakota and which qualify for assistance based on that criteria. The plan also monitors rail traffic and commodity movements to identify shifting trends in the railroad system. The current plan can be found at: https://dot.sd.gov/transportation/railroads/state-rail-plan.

- **Strategic Highway Safety Plan (SHSP)** – This SHSP focuses the State's safety partners on a coordinated and comprehensive effort to improve highway safety. The plan is developed through the coordination with local, state, tribal and federal agencies; engineers; law enforcement officials; educators; emergency medical services officials; metropolitan planning organizations; safety advocacy groups; and others concerned with highway safety in South Dakota. Updated every five (5) years, it offers proven and experimental strategies to reduce traffic crashes, injuries and fatalities. The current plan can be found at: https://dot.sd.gov/media/documents/SHSP_FINAL_Reduced.pdf.
- **Statewide Highway Needs Analysis** - This report examines each mile of state highway in South Dakota. It contains an assessment of the transportation system's pavement condition and provides the Pavement Management System assessment data for future pavement management decisions. An interactive map can be found at: https://apps.sd.gov/hr53needsbook/.
- **Metropolitan Planning Organization (MPO) Long Range Transportation Plans**– Once a community's US census population exceeds 50,000, an MPO must be created to provide comprehensive planning to meet traffic, business, residential, and land development needs for the urbanized area. Currently, the Sioux City, Rapid City, and Sioux Falls Areas MPOs develop their LRTPs every four (4) years through collaboration with state DOTs. The MPO's plans are an integral part of the State's transportation planning activities and are included in the planning process and the STIP development. *Rapid City Area MPO plan can be found at:* http://rapidcityareampo.org/application/files/6115/3962/2450/RAPIDTRIP_2040..pdf *Sioux Falls Area MPO plan can be found at:* http://siouxfallsmpo.org/files/1616/0504/0635/SiouxFalls_2045_LRTP_FINAL.pdf, *Sioux City Area plan can be found at:* https://simpco.org/divisions/transportation-planning/long-range-transportation-plans-lrtp/
- **Planning Studies and Analyses** - Corridor and interchange modification studies are tools used for data driven decisions to meet needs that are identified during project prioritization or to further analyze transportation trends. Studies help ensure that resources are managed in an effective way. For a current list of on-going studies, visit: https://dot.sd.gov/projects-studies/projects/special-studies
- **Freight Plan** – The Freight Plan guides improvement of South Dakota's overall freight system and supports SDDOT's mission to efficiently provide a safe and effective public transportation system, the plan's goals are aligned with the LRTP. The plan contains industry-specific trends and preferential routes used to transport goods through and within South

Dakota, updated on a 4-year cycle. The current plan can be found at: https://dot.sd.gov/media/documents/SDDOTFreightPlanApproved.pdf.

- **Americans with Disabilities Act (ADA) Transition Plan** – This plan establishes a systematic approach for the department to bring any services, facilities or programs into compliance with the Americans with Disabilities Act. For Phase I of the ADA Transition Plan, the department programmed individual projects to address specific features such as missing or non-compliant curb ramps or access to pedestrian push buttons. Sidewalk facilities are being addressed during Phase II of the ADA Transition Plan with stand-alone ADA projects or with reconstruction projects. SDDOT continues to make ADA accommodations in the public right-of-way in conjunction with any alternation or construction/reconstruction project. The latest information can be found at: https://dot.sd.gov/programs-services/civil-rights/americans-with-disabilities-act-ada
- **Statewide Intelligent Transportation System (ITS) Architecture Plan** - This plan defines and develops regional ITS architecture for the State of South Dakota. Some of the ITS outcomes are Safe Travel USA, dynamic signs, highway cameras and commercial vehicle identification.

Together, these components are part of the LRTP, and additional components may be added as they are identified. In a multi-modal system, a change in one typically influences other modes. The planning process aids in understanding these interrelationships among the planning considerations and the modes to increase efficiency and facilitate resilience.

Plan Components

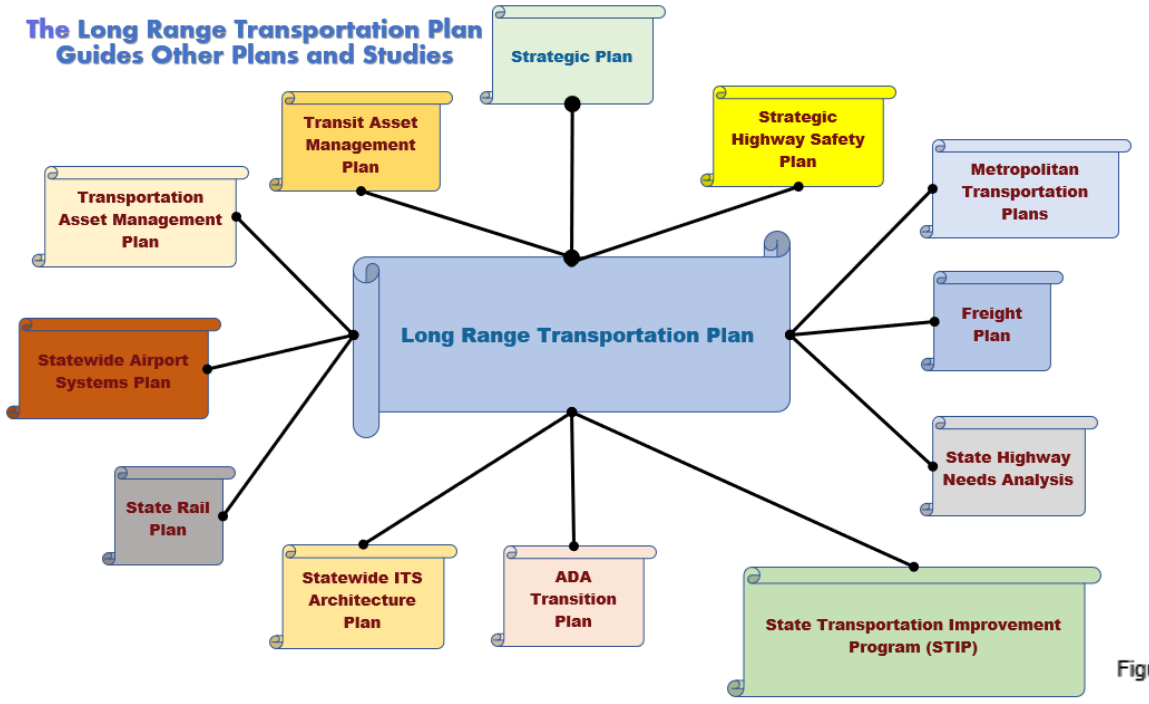


Figure 1-3

The LRTP is updated every five to ten years to factor in new trends, developments, interrelationships, and major regulatory changes. Like other planning activities, the updating process is conducted in a public forum to achieve the highest level of public participation.

Planning Factors and Coordination

The Fixing America's Surface Transportation Act (FAST Act) provides federal funding authorization for the highway network, highway safety, alternative modes, and mass transportation through Fiscal Year 2020, with an extension through 2021. The FAST Act builds upon the foundation set by past transportation bills, namely the Intermodal Surface Efficiency Act of 1991 (ISTEA) and the Transportation Equity Act for the 21st Century (TEA-21), Safe Accountable Flexible Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), and Moving Ahead for Progress in the 21st Century Act (MAP-21). Collectively, these bills govern spending by requiring each state to carry out a transportation planning process that provides for consideration of projects and strategies that will:

1. Support the economic vitality of the nation, especially by enabling global competitiveness, productivity, and efficiency;
2. Increase the safety of the transportation system for motorized and non-motorized users;
3. Increase the security of the transportation system for motorized and non-motorized users;
4. Increase accessibility and mobility of people and freight;
5. Protect and enhance the environment, promote energy conservation, improve the quality of life, and promote consistency between transportation improvements and State and local planned growth and economic development patterns;
6. Enhance the integration and connectivity of the transportation system across and between modes, for people and freight;
7. Promote efficient system management and operation;
8. Emphasize the preservation of the existing transportation system;
9. Improve resiliency and reliability of the transportation system and reduce or mitigate stormwater impacts of surface transportation; and
10. Enhance travel and tourism.

A challenge for the SDDOT is to coordinate solutions which best balance these factors throughout the planning, construction, and service life of its assets. The SDDOT meets this challenge by including these planning factors at each venture

of decision-making in the development of the LRTP, STIP, and in the Statewide Planning Process.

Public Participation

SDDOT has valued public input and review since the late 1970's. During the planning process, various input is evaluated to determine when suggestions have valid merit to pursue as well as its reasonable feasibility. While updating the LRTP, the following elements of public participation are implemented:

1. Collaborate the LRTP and STIP planning processes to inform the public about multi-modal options and tradeoffs.
2. Create ad-hoc and review meetings to gather input, develop suggested revisions to the LRTP, while assessing new projects for the STIP.
3. Align various plans to eliminate conflicting goals.
4. Identify and engage with stakeholders through:
    a. Pursuit of input from citizens; public agencies; transportation agency employees; providers; users of public transportation providers; freight shippers; planning districts; bike and pedestrian facility users; and persons with disabilities; to formulate, guide, and coordinate new policies with these stakeholders.
    b. Gather input from local government officials, environmental agencies, state agencies, conservation agencies, MPOs, Tribal Governments, federal agencies and the BIA from the outreach identified in the SDDOT Participation Plan.
5. Obtain input from appointed input groups that include the Aeronautics Commission, the Railroad Board, the Transportation Commission, and the Scenic Byways Committee to update the Long Range Statewide Transportation Plan.

Underserved and underrepresented groups will be included for all input opportunities.

The SDDOT will coordinate data collection, analysis, and evaluation of transportation plans with the management systems, other plan components, and all the input groups and stakeholders as part of its public participation plan. Transportation plans will be coordinated with other agencies responsible for recreation, tourism, economic development, multi-modal facilities, environmental resources planning, corridor preservation, rail planning, and social, economic employment, energy, environmental, land use, housing, and community development effects of transportation actions.

SDDOT's Public Involvement Plan contains detailed information regarding the Department's efforts and related policies, which can be found at the plan is currently in the process of being updated, with an estimated completion date of April 2022:
https://dot.sd.gov/media/documents/PublicInvolvementPlanFinalSignatureCopy031810.pdf

Public Involvement Plan

The Public Involvement Plan for this plan's update during a national pandemic consisted of the following activities:

- Public Comment Period – Appendix A
- External stakeholder contacts – Appendix B
    - SD Historic Preservation Office
    - US Fish and Wildlife Services
    - SD Game, Fish, & Parks
    - BLM
    - BIA
    - US COE
    - SD Department of Agriculture and Natural Resources
    - Shipping/Freight
    - Planning Districts
    - MPOs
    - Municipal League
    - Native American Tribes
    - Transit/Public Transportation
    - Private Transit Providers
    - FHWA
    - FTA
    - US Corps of Engineers
- Tribal Planners in-person presentation
- Public comment period
- Online presentation with audio
- Gather input, comments, and responses – Appendix A
- Final Secretary of Department of Transportation Approval

Chapter 2: The State Transportation System

Introduction

South Dakota's transportation system accommodates multiple modes of transportation. This chapter will give an overview of the existing transportation network that moves people and goods throughout South Dakota by means of its highways, bridges, transit, rail, bicycle and pedestrian accommodations.

This chapter explains the composition of the existing transportation system and identifies the challenges the SDDOT faces to maintain its current system ensuring people and goods travel safely and efficiently through sustainable means.

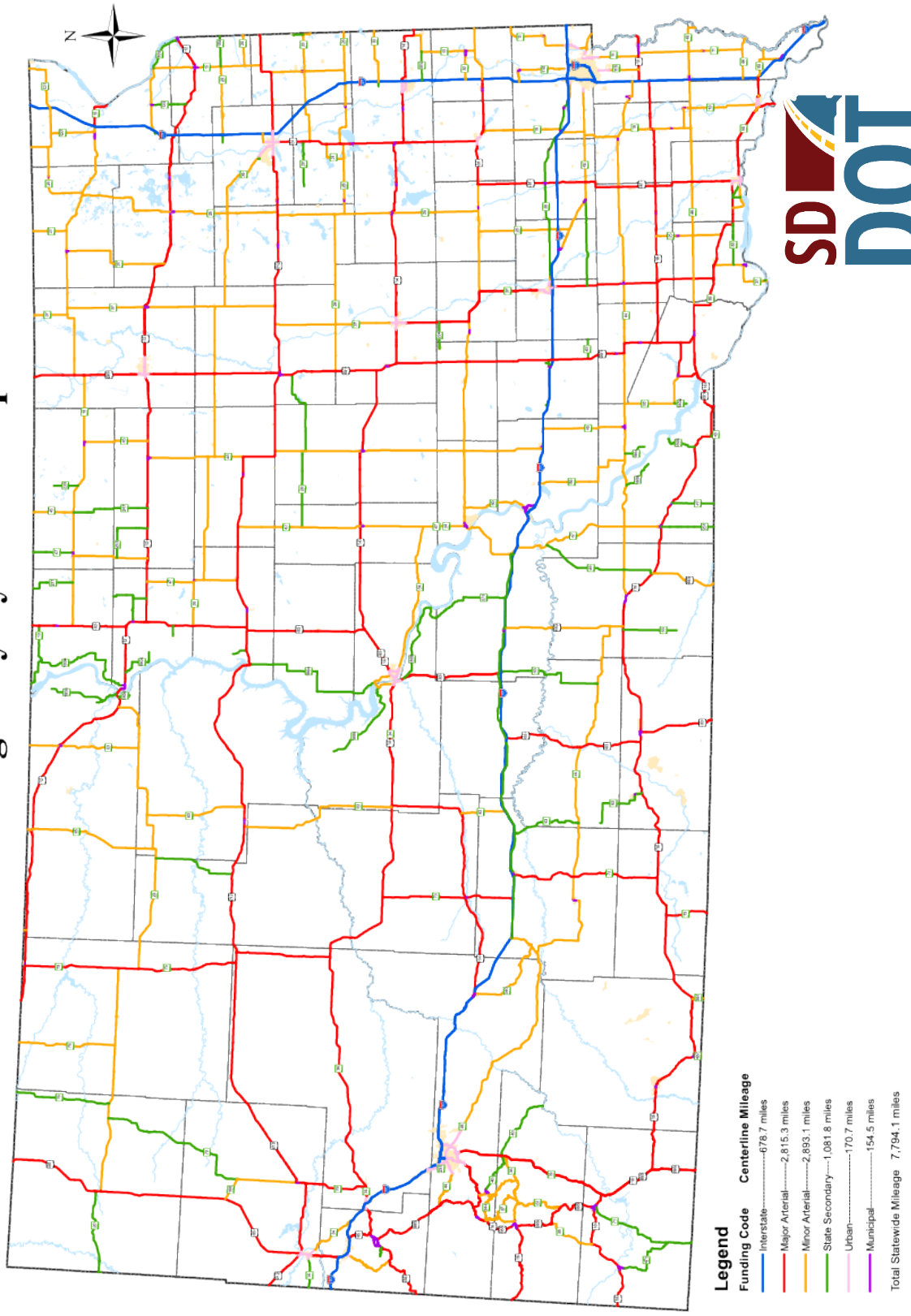
Highway System

South Dakota contains 81,969 miles of state, county and local roadways. The State generally has jurisdiction over the highways that move traffic longer distances between states, counties, townships, and municipalities. Townships and municipalities are generally responsible for local road networks, which serve shorter-distance trips. Counties, in turn, are responsible for their system that mainly serves medium-distance trips connecting the State Trunk Highway system with local roads.

- **State Highway System** (Map 2-1)
  - 7,794 miles of interstate and state highways which handles 68 percent of vehicle miles traveled* (VMT)
  - The State owns and maintains 9.5% of the total road network
  - The system includes 1,807 state-owned structures (1,275 bridges/532 culverts)
  - Annual VMT on state and interstate highways was 6.7 billion miles in 2019
- **Local Road Network**
  - 73,904 miles of county roads, township roads, tribal roads, BIA roads, and municipal streets that handle 32 percent of the state's VMT. Of the Local Road Network, BIA and tribal roads comprise approximately 1,367 and 187 miles, respectively
  - There are 4,004 structures (3,268 bridges/736 culverts) on the county and municipal streets
  - Annual VMT on the local roads was 3.15 billion miles traveled
- **Annual VMT on all roads in South Dakota was 9.9 billion miles**

* **Vehicle Miles Traveled** is a unit defined as the number of miles traveled by a vehicle in an area or over a stretch of roadway. One vehicle traveling the distance of one mile equals one.

State Highway Systems Map



Map 2-1

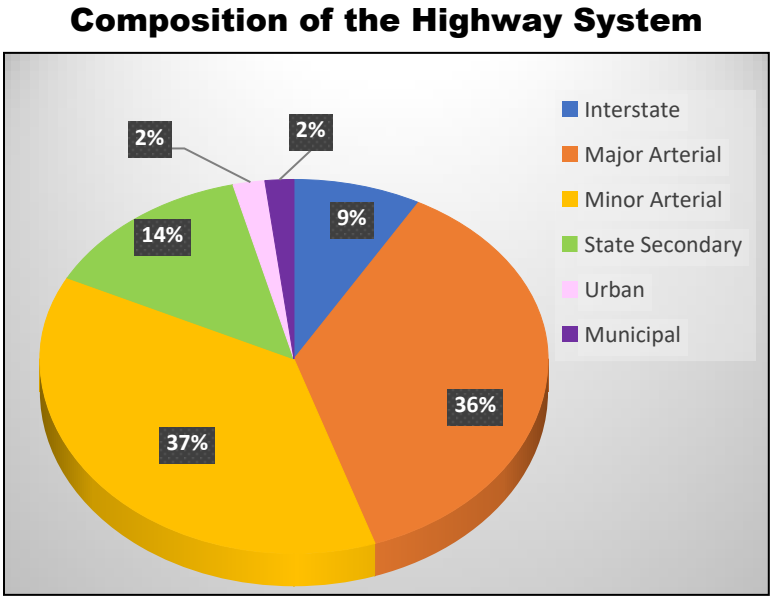


Figure 2-1

Figure 2-1 represents the composition of the State Highway System. Figure 2-2 shows the length of the state's system and that of local, while Figure 2-3 represents the comparison between length of 81,969 miles and amount of travel totaling 9.9 billion VMT, illustrating that travel occurs more frequently on the State Highway System.

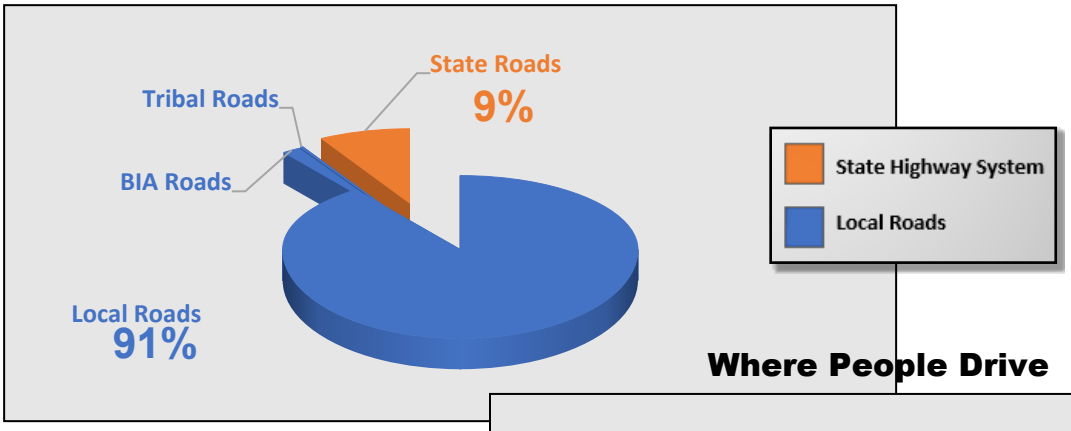


Figure 2-2

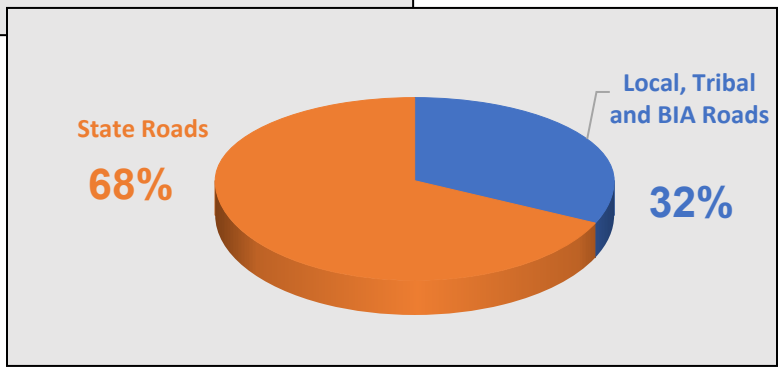


Figure 2-3

Challenges for the Highway system and local road network

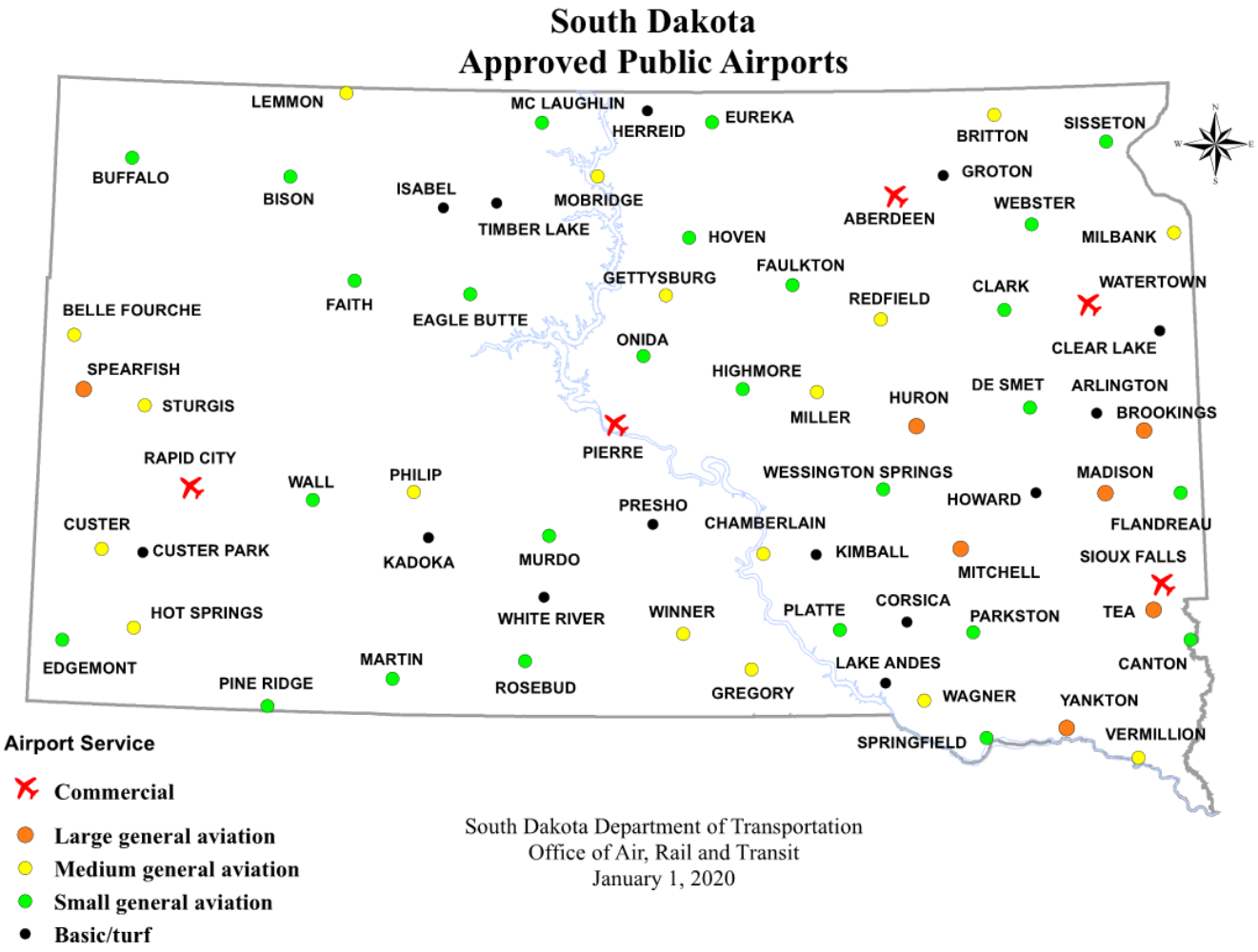
- Improving safety
- Jurisdictional budgetary limitations
- Maintaining and enhancing structure and highway conditions
- Solving mobility challenges
- Mitigating sensitive environmental impacts
- Promoting access management
- Meeting the transportation needs of the population's aging sector
- Maintaining farm to market connectivity
- Increasing tourism and supporting recreation
- Enhancing or maintaining intermodal connectors
- Uncertain future state and federal revenues
- Responding to threats, disasters, and emergencies
- Accommodating freight concerns for transporting goods
- Differentiating needs from wants to allocate limited resources

Air Transportation

South Dakota's aviation system supports air transportation by providing facilities and services needed for a wide range of users. Of the total 69 airports, the system includes 56 airports that are open to the public, publicly owned, and are included in the FAA's National Plan of Integrated Airport Systems (NPIAS). Five of the system airports support some level of commercial service, while the remaining 51 support general aviation only. The airport system consists of facility types as identified below; wherein some airport locations have multiple facility types:

- Commercial Service; 5 facilities.
- Large General Aviation; 6 facilities.
- Medium General Aviation 17 facilities.
- Small General Aviation; 26 facilities.
- Basic General Aviation; 15 facilities

Map 2-2 represents approximate locations of South Dakota's 69 airports approved by the South Dakota Aeronautics Commission.



Map 2-2

Aviation System Facts

- 69 public-use airports in South Dakota
- 5 airports provide commercial service
- Airports with freight terminals
  - Sioux Falls
  - Pierre
  - Rapid City
  - Watertown
  - Aberdeen
- Public airports with military hangers
  - Sioux Falls
  - Rapid City
  - Aberdeen
- Military facilities
  - Ellsworth Air Force Base (No Public Access)
- Past and Current Trends
  - 688,849 enplanements in 2008
  - Increase of 18% between 1997 and 2008
  - 903,958 enplanements in 2019
  - Increase of 23.8% between 2008 and 2019

Aviation Challenges

- High tower obstructions
- Wildlife and public encroachments on airport properties
- Limited direct passenger service
- Funding sources are limited
- Incompatible land use around major airports and military facilities
- Weather reporting inaccuracy due to airport proximity to weather station
- Travel industry fluctuations

Rail

Nearly 2,000 miles of rail line provide vital economic services to freight operations, rail companies, and citizens in South Dakota. But a major bankruptcy filing and embargo by the privately owned Milwaukee Road in 1980 once threatened South Dakota's rail industry, halting service to 50 percent of the state's rail mileage. Faced with deteriorating tracks, dwindling freight traffic, and possible abandonment of the lines, the state knew it had to act quickly to ensure its future economic growth.

After identifying embargoed lines that were vital to South Dakota's economy, the state purchased many of those lines with plans to eventually return them to the private sector. Restoration of the lines since the '80s has proven to be a challenge, therefore, SDDOT had to make major investments in their rehabilitation.

In the past four years, SDDOT stepped up its efforts to restore the Mitchell to Rapid City (MRC) and Sioux Valley lines. As of 2019, with the help of federal grants, the Department had allocated $67.4 million in state and federal funding to reconstruct two sections of the MRC line and $30 million to reconstruct the Sioux Valley line. These improvements included:

- Upgrading rail to modern standards
- Replacing broken and damaged ties
- Repairing bridges and culverts to increase load capacity

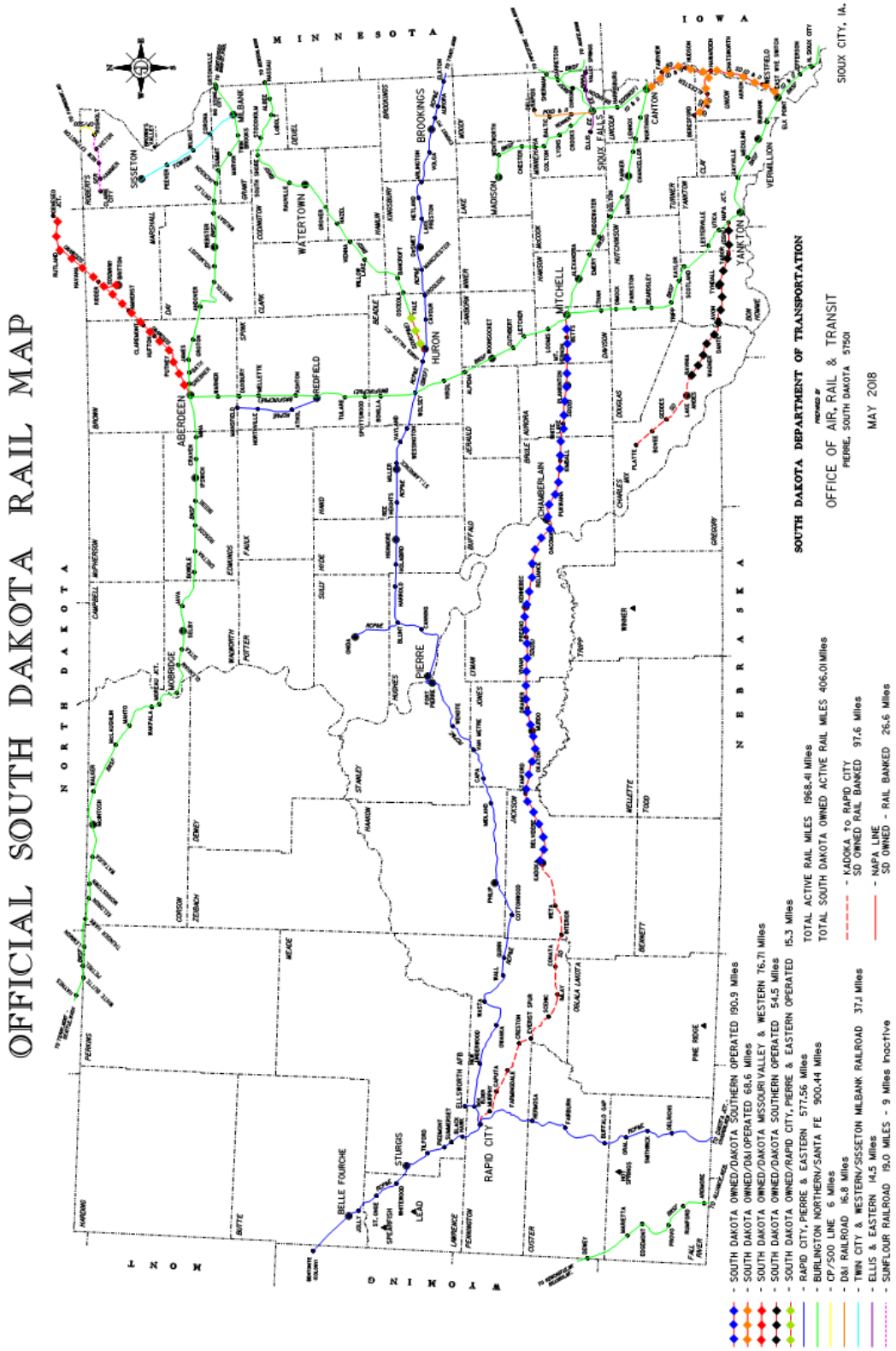
Four major agribusinesses have invested millions to build grain elevators next to the MRC line alone. In 2020, SDDOT accepted offers to sell the MRC line ($13 million) and Sioux Valley line ($10 million) to Watco and the Dakota and Iowa Railroad, respectively. These purchases will foster significant investments in track maintenance and structural improvements and open opportunities for further development. Economic benefits to farmers, ranchers, shippers, and the state's economy will far exceed the public's capital investments in the lines.

System Facts

- There was 1,884 miles of rail lines operating in South Dakota in 2010. The 2020 mileage total of 1,977 miles represents an increase of 4.9% in operating miles
- The rail system contains 2,992 public and private railroad crossings
- There are 8 railroad companies that operate in South Dakota
- 5.1 billion tons of freight were transported in South Dakota in 2009
- Box Elder has a truck-rail intermodal connection

Rail Challenges

- Preserving local rail service
- Improving rail condition
- Addressing crossing safety and closures
- Funding for track upgrades and improvements on state owned lines


OFFICIAL SOUTH DAKOTA RAIL MAP
SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION
prepared by
OFFICE OF AIR, RAIL & TRANSIT
PIERRE, SOUTH DAKOTA 57501
MAY 2018
MINNESOTA
IOWA
NEBRASKA
NORTH DAKOTA
MONTANA
WYOMING
ABERDEEN
WATERTOWN
BROOKINGS
SISSETON
MILBANK
SIOUX FALLS
SIOUX CITY, IA.
MITCHELL
YANKTON
HURON
REDFIELD
PIERRE
MOBRIDGE
RAPID CITY
STURGIS
BELLE FOURCHE
LEAD
CHAMBERLAIN
- SOUTH DAKOTA OWNED/DAKOTA SOUTHERN OPERATED 190.9 Miles
- SOUTH DAKOTA OWNED/D&I OPERATED 68.6 Miles
- SOUTH DAKOTA OWNED/DAKOTA MISSOURI VALLEY & WESTERN 76.71 Miles
- SOUTH DAKOTA OWNED/DAKOTA SOUTHERN OPERATED 54.5 Miles
- SOUTH DAKOTA OWNED/RAPID CITY, PIERRE & EASTERN OPERATED 15.3 Miles
- RAPID CITY, PIERRE & EASTERN 577.56 Miles
- BURLINGTON NORTHERN/SANTA FE 900.44 Miles
- CP/SOO LINE 6 Miles
- D&I RAILROAD 16.8 Miles
- TWIN CITY & WESTERN/SISSETON MLBANK RAILROAD 37.1 Miles
- ELLIS & EASTERN 14.5 Miles
- SUNFLOUR RAILROAD 19.0 MILES - 9 Miles inactive
TOTAL ACTIVE RAIL MILES 1968.41 Miles
TOTAL SOUTH DAKOTA OWNED ACTIVE RAIL MILES 406.01Miles
- KADOKA to RAPID CITY
SD OWNED RAIL BANKED 97.6 Miles
- NAPA LINE
SD OWNED - RAIL BANKED 26.6 Miles

Map 2-3

Public Transit

The SDDOT acts as a grant recipient of public transit and specialized transportation services. SDDOT does not directly provide the services, but contracts for services to be delivered within South Dakota through the awards of grants to transit providers.

Administered programs include:

- Federal Transit Administration (FTA) 5311 operations grants for rural public transit agencies
- FTA 5303, 5304 and 5305 transportation planning in metropolitan areas and states
- FTA 5339 capital grants to replace, rehabilitate and purchase buses and related equipment and to construct bus related facilities

These public transit programs are also supported by rider fares, private contributions, donations, and state, city, and county money.

South Dakota's transit system can be categorized as follows:

- **Rural Provider**: Public Transportation agencies are primary providers of transit services to the public in designated service areas.
- **Urban Provider**: Public Transportation agencies are primary providers of transit services to the public in urbanized areas.
- **Specialized Provider**: Agencies that do not provide transportation services as their primary purpose. These agencies provide transit service as a secondary or support function for clients or users of their primary services.
- **Inter-City Bus**: Jefferson Lines is the inter-city bus operator in South Dakota. Several SD rural transits act as a feeder service to Jefferson Lines.

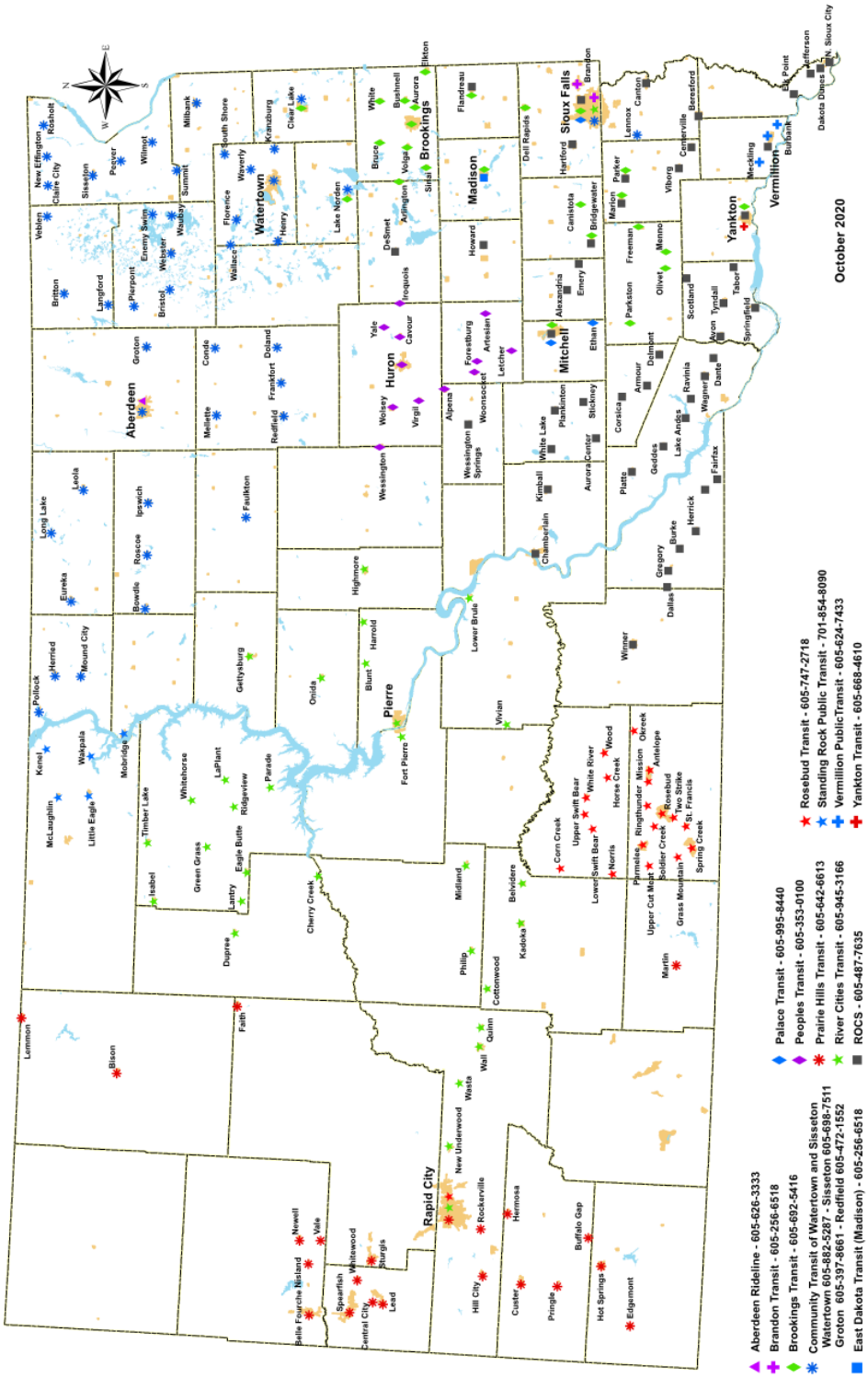
More information is included on each of the provider's website, which can be located through an interactive map page found at:
https://sdbit.maps.arcgis.com/apps/webappviewer/index.html?id=ac34ce28867c4534b5b6b060e0213268

Transit System Facts

- Rapid Transit is the urban provider for the Rapid City area
- Sioux Area Metro (SAM) is the urban provider in the Sioux Falls area
- Most transit rides occur on the above urban providers
- There are 14 rural providers throughout the state
- There is one (1) inter-city provider in the state, supplemented by various rural providers
- There are two (2) tribes that provide public transit in the state, Rosebud and Standing Rock

See Map 2-4 on the following page for transit providers within South Dakota.

South Dakota Communities Served by Rural Transit Providers



Map 2-4

Transit Challenges

- Providing mobility to seniors, low-income households, and people with disabilities
- Local funding sources
- Increasing costs of maintenance and vehicles
- Balancing fleet size with ridership demand
- Coordination between competing transit providers in service area overlap
- Providing service to remote areas of South Dakota
- Sustaining services to areas with declining population and ridership
- Competition with ride on demand services for urbanized transit systems (Lyft, Uber, etc.)

Chapter 3: Trends

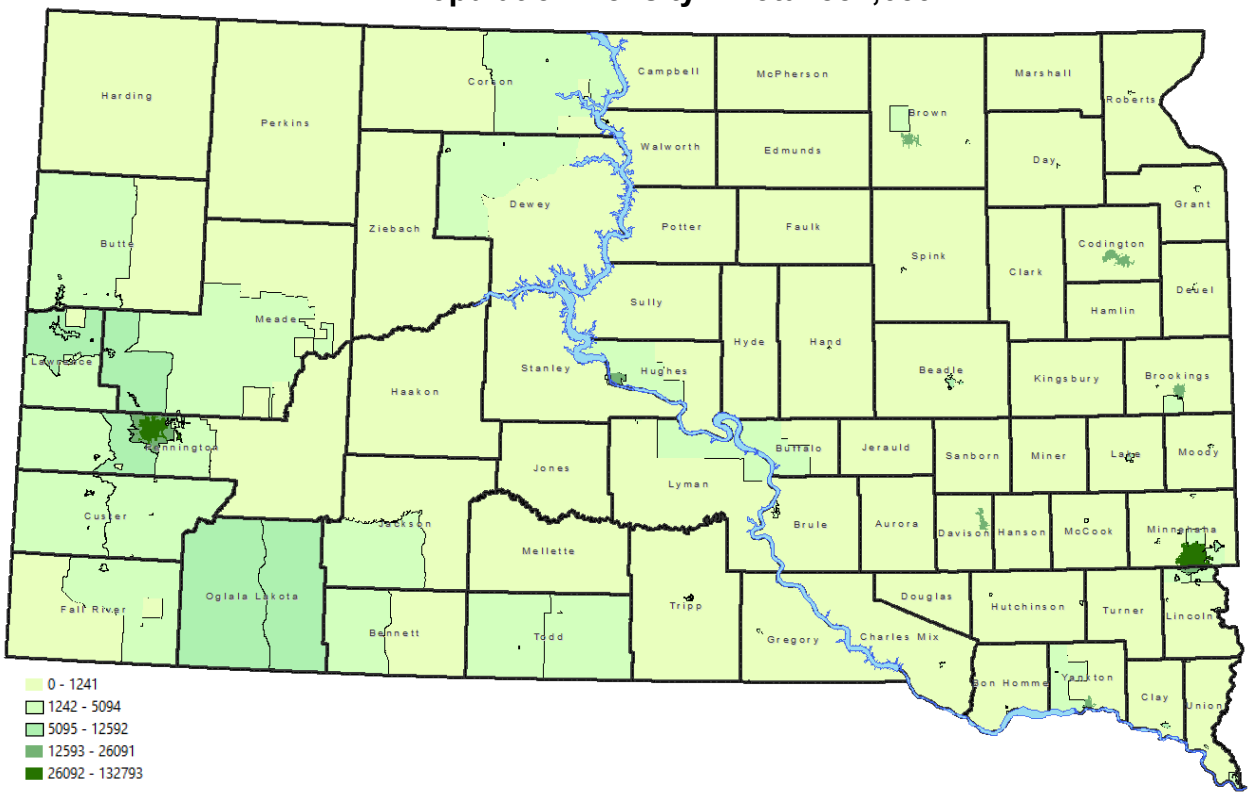
Overview

There are several elements that affect the demand for transportation. These include population, safety, travel patterns, economics, and environmental protection. This chapter will highlight the trends associated with these influential factors.

Population

With a total population estimated at 884,659, South Dakota is sparsely populated except for two (2) metropolitan areas; Rapid City on the west side of the state, and Sioux Falls on the east side. The Missouri River meanders southeasterly through the center of the state from north central to south eastern, slicing the state into diverse land terrain that has been settled over time. Generally, agriculture flourishes in the east while livestock ranching more broadly occupies the western side of the state. To this day, these regions and its people are often characterized as west river or east river in both topographical and cultural senses. Map 3-1, using data from the U.S. Census Bureau, illustrates how the Missouri River forms the eastern and western regions of the state and shows a quantified gradient population density from the 2010 census tracts throughout South Dakota.

Population Density – Total 884,659

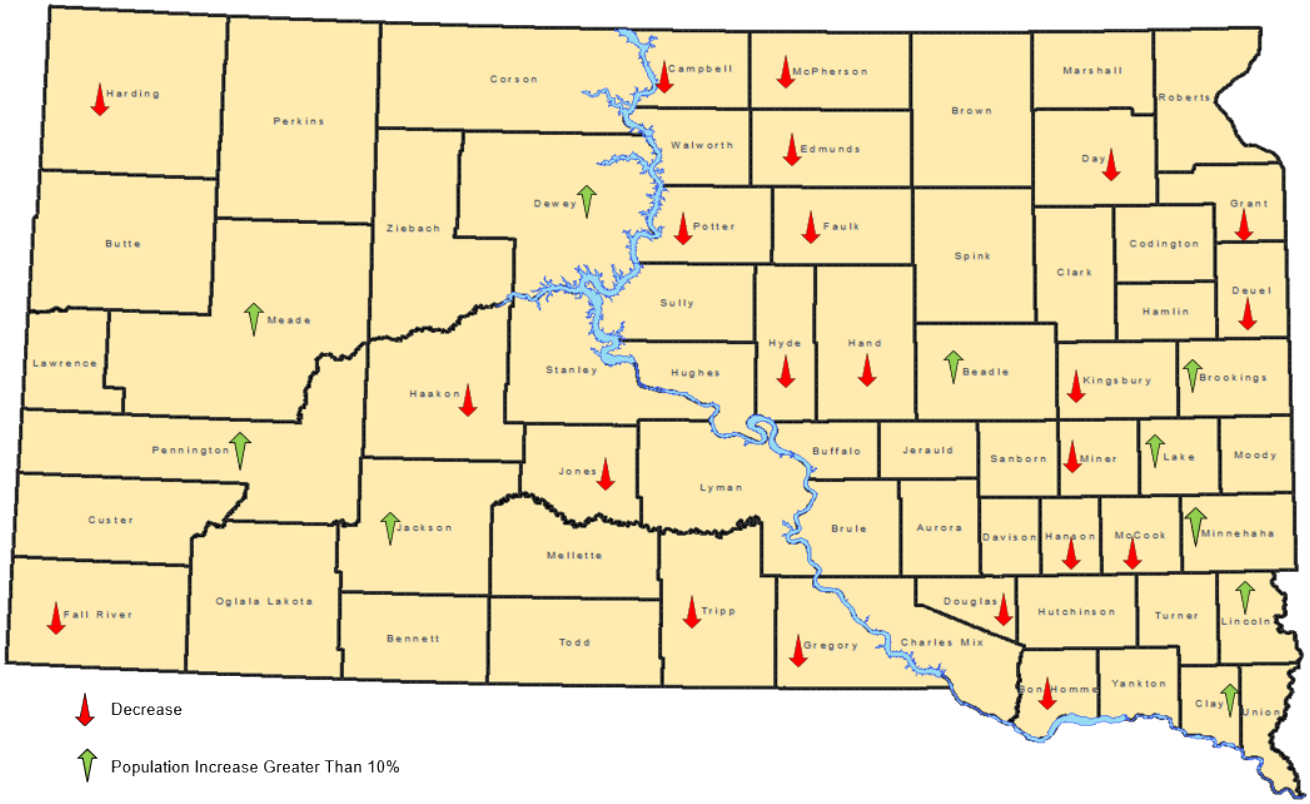


Map 3-1

A gradual movement from the rural to urban areas remains the trend for South Dakota's population, even with new residents moving into the state. The state's ten largest cities had a combined population of 401,407, or 45.5% of the state's total 2018 population. The three most populated counties remain Minnehaha with 192,876, Pennington with 111,729, and Lincoln with 58,807. Minnehaha and Lincoln County both contain parts of the Sioux Falls metropolitan area, while Pennington County is the most populous county in the Rapid City metropolitan area.

Between 2008 and 2018, one-third of South Dakota's 66 counties decreased in population. Map 3-2 illustrates these population drops and the counties that reported the largest growth rates. There were ten (10) counties where populations increased greater than 10% between 2008 and 2018, contributing to a cumulative rise in state population.

Population Change by County 2008 – 2018

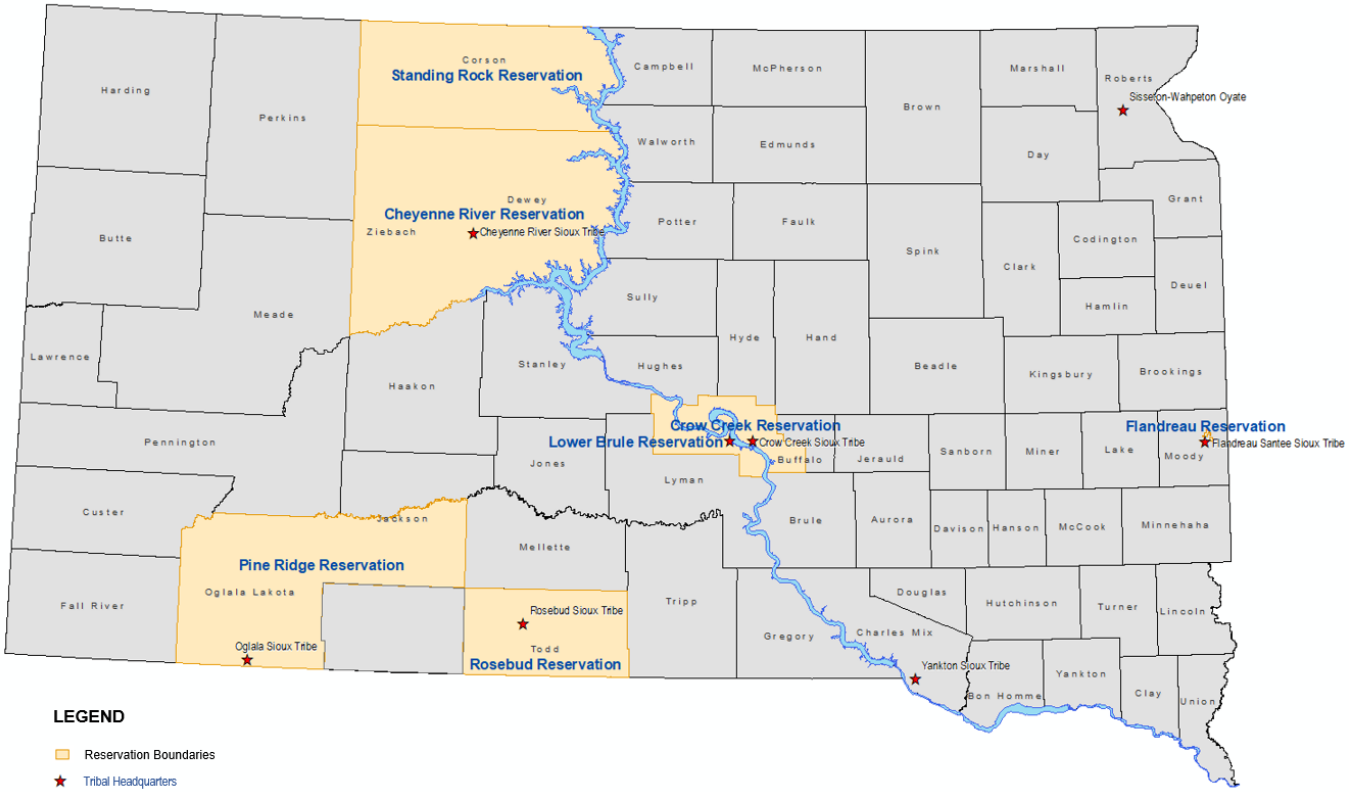


Map 3-2

Native Americans continue to play a large role in the demographics and culture of South Dakota. Of the nine Native American reservations, Pine Ridge is the largest, with a population of 19,779 as last reported in 2017, followed by the Lake Traverse (10,967) and Standing Rock (8,616) reservations. The smallest reservation in the state is the Flandreau Reservation, with a population of 442 when last reported in 2017.

Native Americans comprise 9.0% of the state's overall population. Map 3-3 shows the locations and headquarters of the various tribes of South Dakota.

South Dakota Tribes



Map 3-3

Grant County's population decreased from 7,389 in 2008 to 7,147 in 2018, which was an average decrease of -3.3% over a ten-year period. Hyde County experienced the largest reduction of -10.3% over the course of the past decade, while the smallest decrease was Perkins County, where the population decreased by 14 people, equaling a -0.5% change during the same period. However, population growth in the cities negates these smaller changes in terms of statewide counts. Collectively, the 22 counties that did see populations decline shared an average -3.3% decrease from 2008 to 2018.

Overall, the state population continued showing slight but steady growth according to the most recent population estimates of 884,659 from the US Census Bureau as of July 1, 2019, which reflected an approximate 8.7% increase since the census of 2010.

Transportation Safety

Transportation safety is an essential part of the SDDOT's mission. The SDDOT is committed to improving safety for the transportation system. The number of fatalities per 100 million vehicle miles traveled (VMT) steadily decreased from the early 70's to the mid 80's when it leveled off. Since 2000, the state's fatality rate has continued to be above the national average (See Figures 3-1 and 3-2). South Dakota's fatality rate has historically been above the national average despite initiatives developed through the Strategic Highway Safety Plan (SHSP) that aim to lower these fatalities. However, as shown in Figure 3-3, since 2008 the number of Fatalities has seen a slight decline while the number of Serious Injury crashes has decreased significantly.

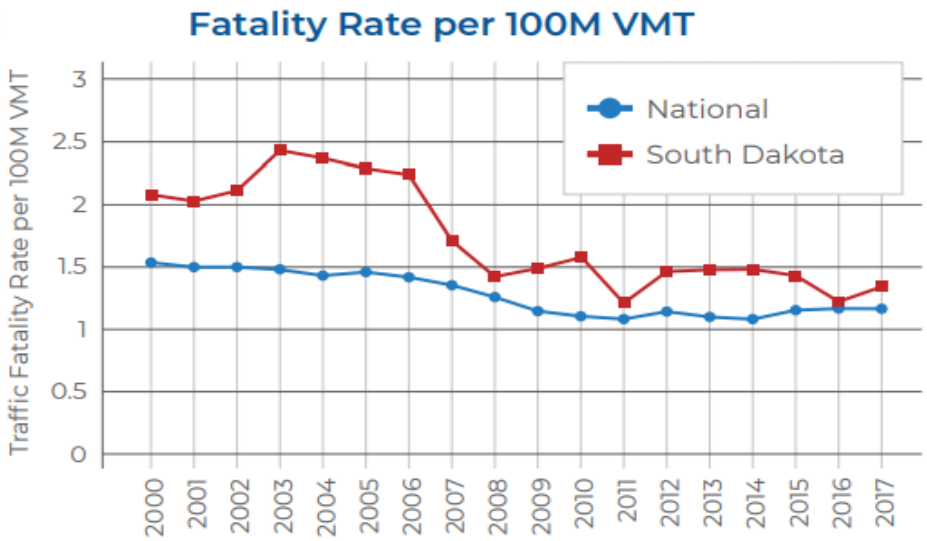


Figure 3-1

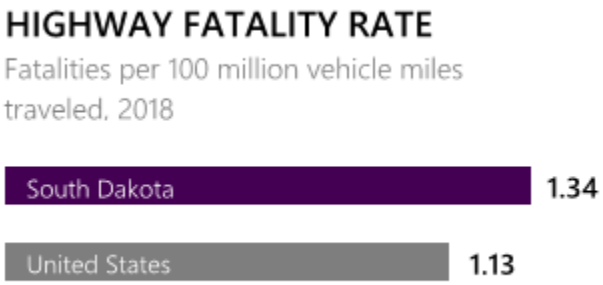


Figure 3-2

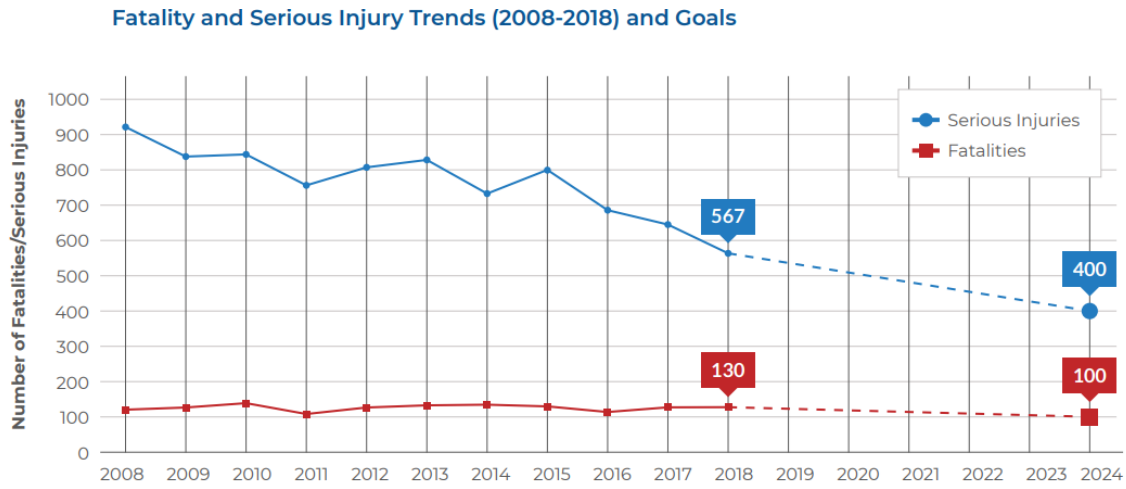


Figure 3-3

Safe Travel USA and 511 offer the traveling public current road conditions and closure information, both are popular tools used by South Dakotans and visitors to avoid inclement roadway conditions. The SDDOT maintains a wide network of cameras and detection equipment located at various locations on Interstate and state highways to aid in dynamic reporting of roadway conditions and resource management.

Below are some of the strategies used by the DOT with the goal of reducing fatalities and serious injuries on all public roadways in South Dakota.

- Use of rumble strips, at centerline and shoulder
- Use of high friction surface treatment
- Shoulder widening
- Durable pavement marking/striping
- Turning/passing lane additions
- Intersection and roadway lighting
- Radar speed feedback signs
- Transverse rumble strips approaching stop-controlled intersections
- Retroreflective backplates on signal heads
- Horizontal curve realignment
- Increased signing and delineation

The SDDOT in partnership with other agencies such as FHWA and the Department of Public Safety; developed the SHSP that describes best practices and supports a planned approach for improving highway safety. Readers are encouraged to refer to the latest SHSP for detailed information.

Figure 3-4, taken from the 2019 SHSP, is an emphasis area matrix that displays the percentage of severe crashes in relationship to each other. The percentages shown in red are an overrepresented contributing factor within that emphasis area. This tool is helpful to understand how the emphasis areas overlap with each other.

Emphasis Area Relationship Matrix

	Drugs and Alcohol	Intersections	Lane Departures	Motorcycles	Older Drivers	Speeding and Aggressive Drivers	Unbelted Vehicle Occupants	Young Drivers
Drugs and Alcohol	-	18%	75%	15%	8%	27%	50%	13%
Intersections	17%	-	12%	21%	26%	15%	26%	25%
Lane Departures	32%	5%	-	22%	14%	30%	39%	16%
Motorcycles	16%	24%	54%	-	18%	20%	0%	8%
Older Drivers	11%	38%	44%	23%	-	16%	23%	8%
Speeding and Aggressive Drivers	28%	17%	73%	20%	13%	-	38%	25%
Unbelted Vehicle Occupants	41%	23%	75%	0%	14%	30%	-	21%
Young Drivers	17%	36%	52%	10%	8%	33%	35%	-
Statewide for All Severe Crashes	**25%**	**27%**	**59%**	**24%**	**19%**	**24%**	**31%**	**19%**

Legend

More than 5 Percentage Points Below*

More than 5 Percentage Points Above*

Within 5 Percentage Points*

* *Statewide for All Severe Crashes*

Figure 3-4

The emphasis areas are further prioritized in the SHSP to determine where safety stakeholders can dedicate resources for the greatest reduction of severe crashes. To formulate and achieve data-driven goals, the SHSP ultimately follows the four-Es, which are:

- **Education**: Driver education is used to establish behaviors that keep people safe on our highways. Educational strategies also aim at changing behaviors that contribute to crashes, such as drunk driving, speeding, lack of safety restraint usage and inattentive driving. Educational efforts also can make good drivers better at using anti-lock brakes and other safety technologies.
- **Enforcement**: Enforcing traffic laws helps to boost compliance. Greater compliance with seat belt laws, laws against drinking and driving, and speed limits will reduce fatalities, injuries, and crashes.
- **Engineering**: Proper design affects driver behavior and the severity of crashes. Modification of the roadway can be a solution in some crash-prone locations. Increasing the number of Road Safety Audits on key projects also could have benefits.
- **Emergency Services**: The difference between a fatal crash and an injury crash can be the length of time it takes to transport victims to appropriate medical care and the quality of care victims receive in transit.

For an in-depth look into the SDDOT's implementation of its key safety strategies, the 2019 South Dakota SHSP describes measures and targets at: https://dot.sd.gov/media/documents/SHSP_FINAL_Reduced.pdf; safety targets established for the Highway Safety Improvement Program (HSIP) are presented later in this plan in Chapter 7.

Transit Safety is a focus area that is apart from the SHSP. The 2017 Public Transportation Safety Plan addresses transit and lays out a formal system consisting of four components, which are:

- Safety Management Policy
- Safety Risk Management
- Safety Assurance
- Safety Promotions

These components comprise a system that rural, urban, and tribal transit services can participate towards achieving statewide safety performance measures and targets as adopted; however, transit services may opt to develop their own. The SDDOT, through its Transit Safety Program; shall monitor, analyze, and improve the state's transit safety performance based on four measurable areas, comprised of:

- Fatalities
- Injuries
- Safety Events
- System Reliability

The performance measure targets adopted in 2017 associated with transit are represented in Table 3-1, below.

Transit Safety Performance Measures	
Safety Measure	**Performance Target**
Fatalities	1 per Total Annual Revenue Miles
Injuries	50 per Total Annual Revenue Miles
Safety Events	75 per Total Annual Revenue Miles
System Reliability	1 Mechanical Failure per 15,000 Revenue Miles

Table 3-1

Security

The South Dakota Office of Emergency Management (OEM), under the Department of Public Safety, establishes policy for state government agencies in a collective response to the threat of natural, technological, or national security emergency/disaster situations. OEM documents the policies, concept

of operations, organizational structures, and specific responsibilities of state agencies in their response to provide for the safety and welfare of citizens. The OEM recognizes and implements the four (4) phases of emergency management during declared emergencies/disasters:

- **Preparedness**: Actions taken in advance of an emergency/disaster to develop operational capabilities and facilitate response operations. Such measures may include the development of plans, procedures, warning and communications systems, mutual aid agreements, and emergency public information.
- **Response**: Actions taken during or after an emergency/disaster to save lives, minimize damages, and enhance recovery operations. These measures include activation of emergency operation centers, plans, emergency communications system, public warning, mass care, shelter, search and rescue, and security measures.
- **Recovery**: Actions taken over the short or long term to return vital life support systems to minimum standards or to return life to normal or improved levels. Such measures include damage assessment, supplemental assistance, economic impact studies, and mitigation of damages sustained.
- **Mitigation**: Actions that can be taken to eliminate or reduce the degree of long-term risk. Such measures include building codes, public education, hazard vulnerability analysis, and zoning laws and resolutions

Because disasters often disrupt the normal functioning of governments, communities and families, OEM provides the centralization necessary to expedite aid, rehabilitation and rapid acquisition and delivery of resources. The SDDOT supports OEM and the State Emergency Operations Center (SEOC) when activated in the event of an emergency. The SEOC provides a structured organization to facilitate response and recovery; the emergency management phases where SDDOT is often a primary force. During these phases, the SDDOT expends resources in the form of personnel and equipment to repair damage to safely open travel routes for the public and emergency services.

The Office of Homeland Security was established in 2003, under the Department of Public Safety; to work with all levels of government to provide safety and security information, critical infrastructure assessments, and assist agencies to develop response plans. When security becomes paramount through increasing threats, SDDOT will develop a specific plan in alignment with this trend to meet the state's transportation needs and may utilize available assistance.

Economics

South Dakota is a largely rural, agricultural state which relies heavily on the transportation system to transport agricultural goods from grain storage to shuttle train

loading facilities or agricultural processors. Transportation and the state's economy are directly related. Economic growth that increases fuel consumption plays a vital role in funding the state's transportation system, while the transportation network remains the driving force serving economic production. This interrelationship allows the transportation system to function and the economy to grow.

Economic Interrelationship

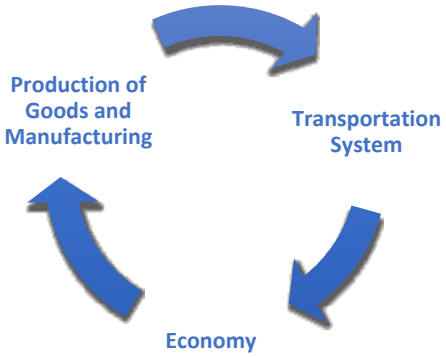


Figure 3-5

South Dakota's economy is based on finance, manufacturing, services, government and agriculture. Services and finance account for a high percentage of the state's gross state product (GSP) that serves as an indicator of the state's economic growth over time (Figure 3-6). Agricultural product producers in South Dakota rely on the transportation system to move their goods to market or storage facilities. An efficient and well-maintained transportation network is paramount in supporting a strong economy.

Economic Growth

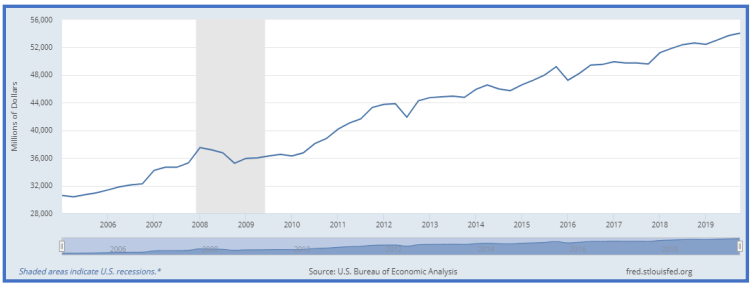


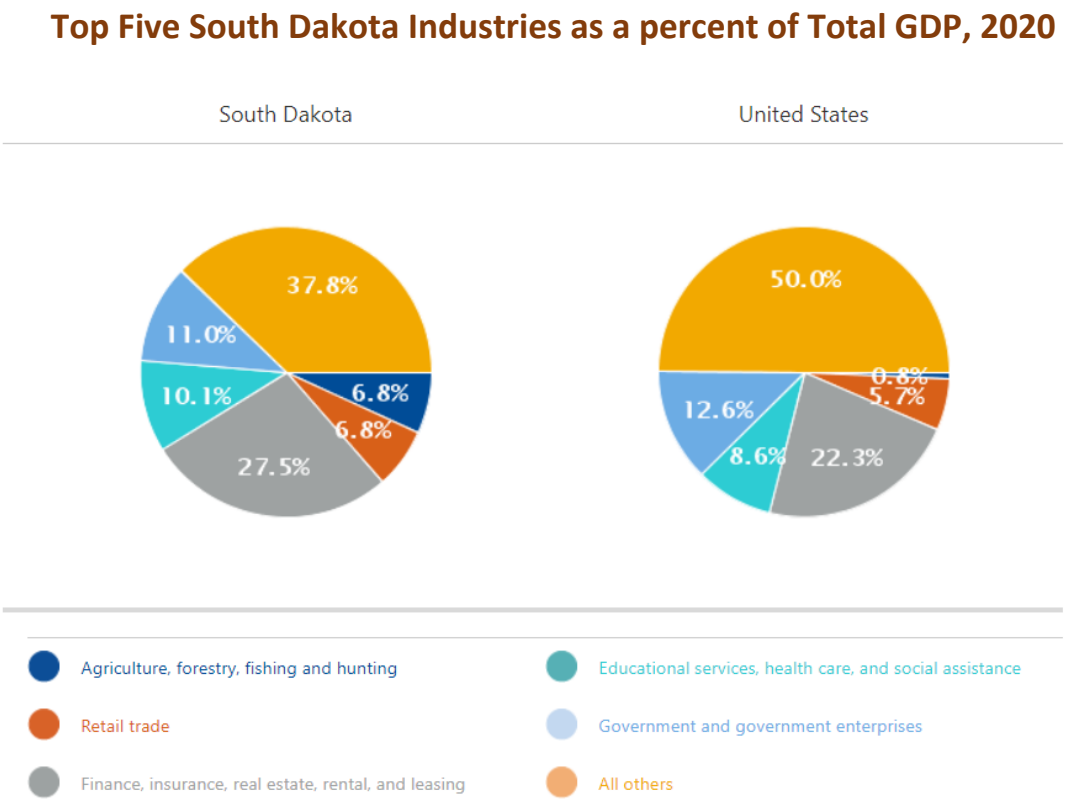
Figure 3-6

The economic condition of South Dakota remains relatively isolated from volatile fluctuations of national trends in comparison to other states. Instead, the state follows trends to a much lesser degree, therefore changes are not as drastic as national growth or decline.

Employment opportunities mirrored the population's move from rural to urban regions but also evolved over time. Total number of jobs as published by the U.S. Bureau of

Economic Analysis for the state was last reported at 611,638 in 2018. Farm employment represented 5.1% of this total, at 31,346 jobs; while nonfarm employment increased to 94.9% by providing 580,292 jobs. The three industries with the highest number of jobs were government (previously included as a portion of Public Administration) at 86,517, healthcare and social assistance at 71,733, and retail at 67,294 jobs.

Figure 3-7 compares South Dakota's contributions to GDP by industry with that of the national ratios for each industry. Figure 3-8 shows the contributions to GDP by industry type in 2019, in millions of dollars.



Source. Retrieved 06/07/2021 from: https://apps.bea.gov/itable/iTable.cfm?ReqID=70&step=1

Figure 3-7

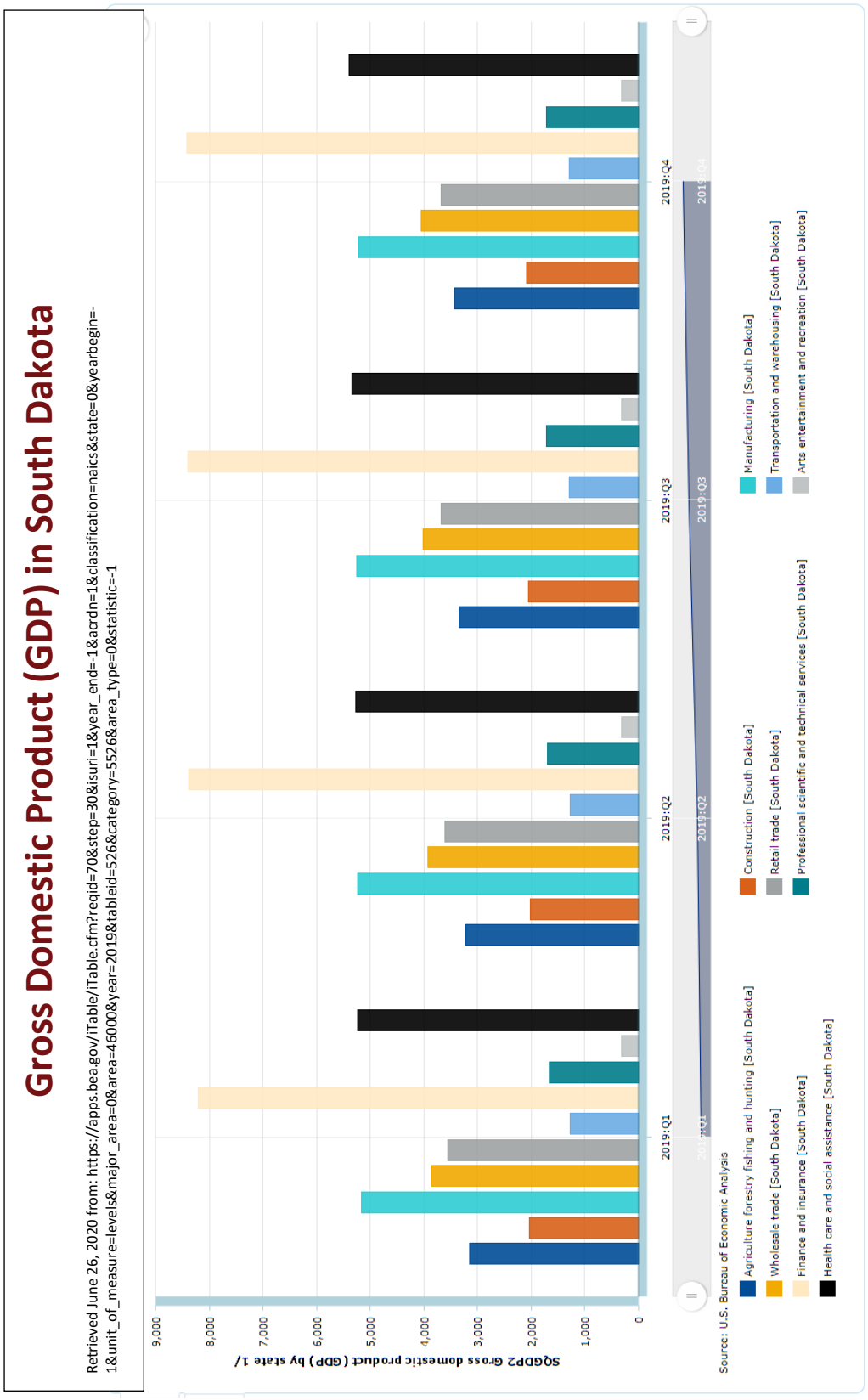

Gross Domestic Product (GDP) in South Dakota
Retrieved June 26, 2020 from: https://apps.bea.gov/iTable/iTable.cfm?reqid=70&step=30&isuri=1&year_end=-1&acrdn=1&classification=naics&state=0&yearbegin=-1&unit_of_measure=levels&major_area=0&area=46000&year=2019&tableid=526&category=5526&area_type=0&statistic=-1
SQGDP2 Gross domestic product (GDP) by state 1/
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
2019:Q1
2019:Q2
2019:Q3
2019:Q4
Manufacturing [South Dakota]
Transportation and warehousing [South Dakota]
Arts entertainment and recreation [South Dakota]
Construction [South Dakota]
Retail trade [South Dakota]
Professional scientific and technical services [South Dakota]
Agriculture forestry fishing and hunting [South Dakota]
Wholesale trade [South Dakota]
Finance and insurance [South Dakota]
Health care and social assistance [South Dakota]
Source: U.S. Bureau of Economic Analysis

Figure 3-8

Travel Patterns

The transportation system facilitates the movement of people to their places of employment through various modes as published by the USDOT Bureau of Transportation Statistics, January 2020 and shown in Figure 3-9. Most travel for work is by car, driving alone. During the second quarter of 2020, the COVID-19 pandemic had significant effect on travel, however, the statewide trend was not as pronounced as nationwide. This pandemic related labor market influence is expected to materially improve in the third quarter of 2021, according to the Congressional Budget Office (Retrieved 02/17/2021 from: https://www.cbo.gov/publication/56368)

Modes of Transportation to Work

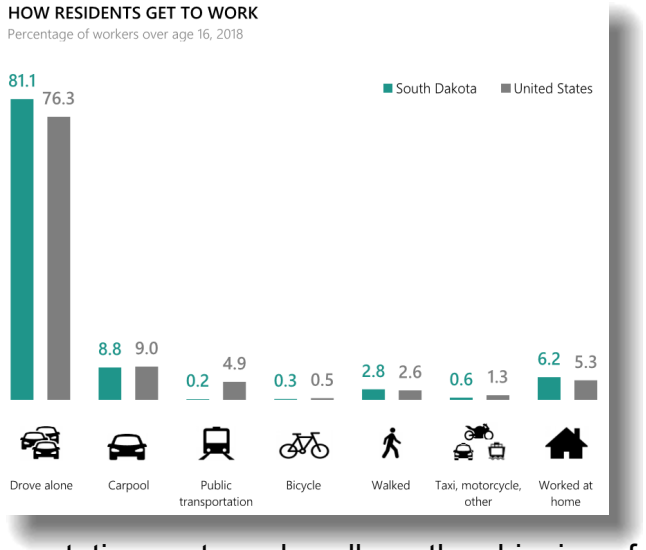


Figure 3-9

South Dakota's transportation system also allows the shipping of goods within the state, from state to state, and coastal ports, as freight. Rail, truck, and air transportation modes in the state are closely connected with the energy and agriculture industries, the later in terms of crop spraying rather than goods transport. Figure 3-10 represents inbound and outbound interstate freight flows.

South Dakota Interstate Freight Flows - 2018

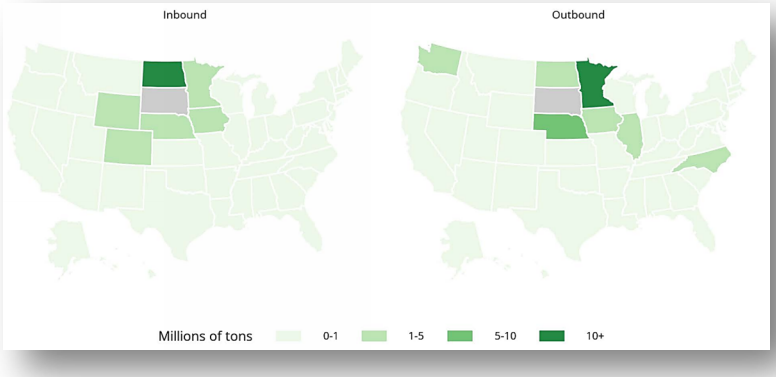
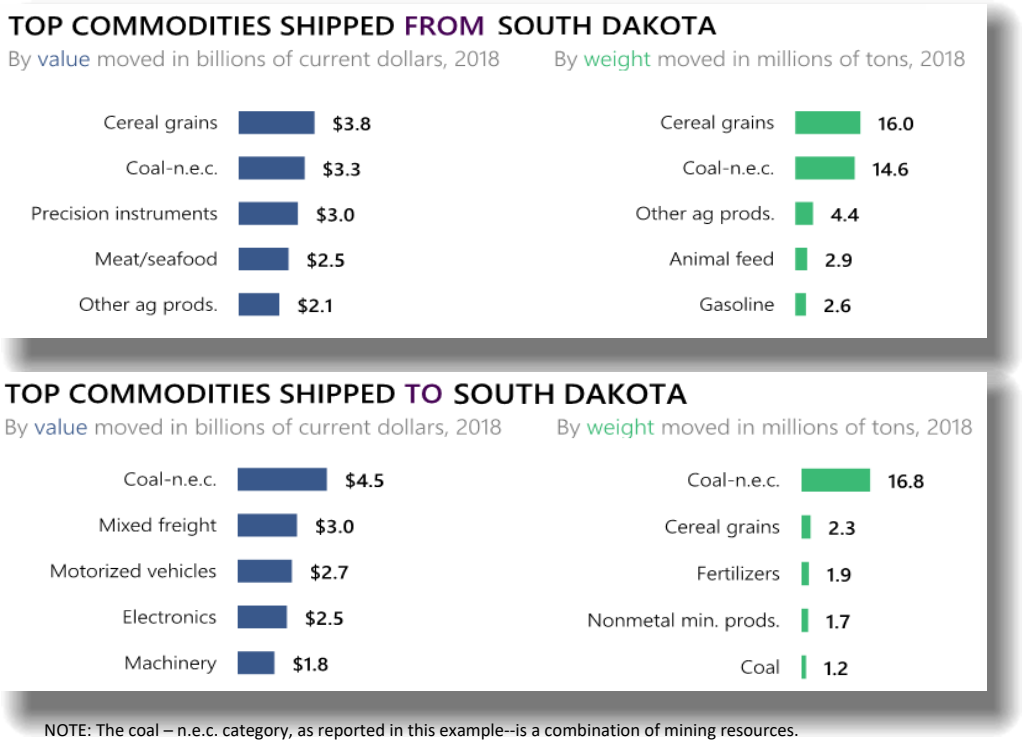


Figure 3-10

Figure 3-11 shows the major commodities shipped from and to the state, by value (billions of dollars) and weight (millions of tons).

Freight Movement



NOTE: The coal – n.e.c. category, as reported in this example--is a combination of mining resources.

Figure 3-11

Retrieved 07/02/2020 from: https://www.bts.dot.gov/sites/bts.dot.gov/files/states2020/South_Dakota.pdf
And 02/19/2021 from: https://www.bts.dot.gov/content/state-transportation-numbers

Environment

The environment is very important to the people of South Dakota and the SDDOT is dedicated to striking a balance between transportation and the environment. The SDDOT coordinates and consults with resource agencies, local stakeholders, and Tribal officials on environmental issues early in the planning stage. Some of the key environmental topics addressed in the early process are:

- Clean Water Act
- Threatened and Endangered Species
- Air Quality
- Historic, Archaeological, and Cultural Resources
- Native American Tribal Coordination

Clean Water Act

South Dakota provides habitat to various species of animals as well as migratory fowl that rely on wetlands to survive. Wetlands are also crucial to flood control. Protecting our wetlands is important in maintaining the water quality and habitat that is valuable to the people of South Dakota. Because of this importance, SDDOT identifies impacts to wetlands early in the planning and design process and monitors through project completion. This continuous process is in place to ensure wetlands are preserved for future generations.

The SDDOT consults with resource agencies to mitigate any impacts the project may have on wetlands. The SDDOT evaluates anticipated impacts and determines means to mitigate any adverse effects. Wetland mitigation varies depending on the quality of the wetland, severity of impact and area of the state in which the wetland is situated. Mitigation can be done on the project site, nearby the project site, or may be compensated for from a wetlands mitigation bank that has been established at another location within a broader area.

Threatened and Endangered Species

NEPA requires the identification and assessment of reasonable alternatives that will avoid and minimize adverse effects on the quality of the human environment, which includes species and habitats protected under the Endangered Species Act (ESA), the Migratory Bird Treaty Act (MBTA), and the Bald and Golden Eagle Protection Act (BGEPA). SDDOT Wildlife Biologists are involved in all stages of project development, evaluating potential adverse impacts and recommending impact avoidance or minimization measures.

Protecting threatened and endangered species in the planning, construction, and maintenance of transportation projects is an important step in complying with the Endangered Species Act. SDDOT consults with the US Fish and Wildlife Service (USFWS) and the SD Game, Fish and Parks Department (GFP) regarding impacts to threatened and endangered species' habitat.

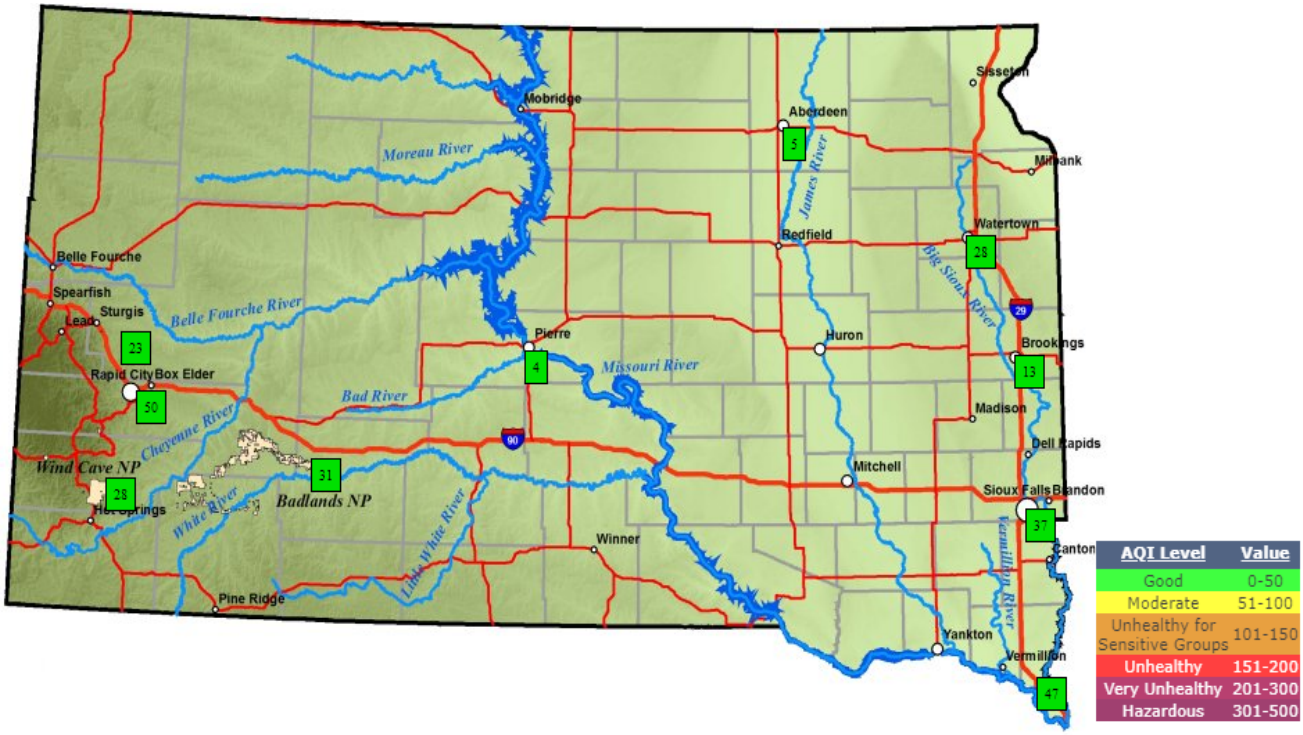
Air Quality

Pollutants may cause health problems, damage crops and plants, and in some cases decrease visibility. The South Dakota Department of Agriculture, Environment & Natural Resources (DANR) regulates air quality through permitting of facilities and

collects hourly data of ambient air at several monitoring sites shown in figure 3-12. The U.S. Environmental Protection Agency (EPA) created an Air Quality Index (AQI) for individuals to understand air quality on a day-to-day basis. South Dakota consistently measures as Good (0-50) in quantitative AQI at most of these various monitoring stations, shown in Figure 3-12. However, Rapid City has a history of lower air quality conditions associated with dust concentrations. Because of this, West Rapid City area has been identified by DANR and subsequentially issued an Air Quality permit in accordance with ARSD 74:36:18:03.

Per its required permit conditions, high wind alerts in the West Rapid City area may be called throughout the year, as conditions pose respiratory health risk to susceptible populace. During a high wind alert, transportation activities that agitate soils are discouraged, such as roadway construction or the stockpiling of materials. Pollution prevention and erosion controls are recommended during high wind alerts that may include watering or chemical treatment to stabilize disturbed soils.

Air Quality Monitoring Stations of Daily AQI Levels



Retrieved 07/06/2020 from: https://denravweb.sd.gov/AirVision/default.aspx

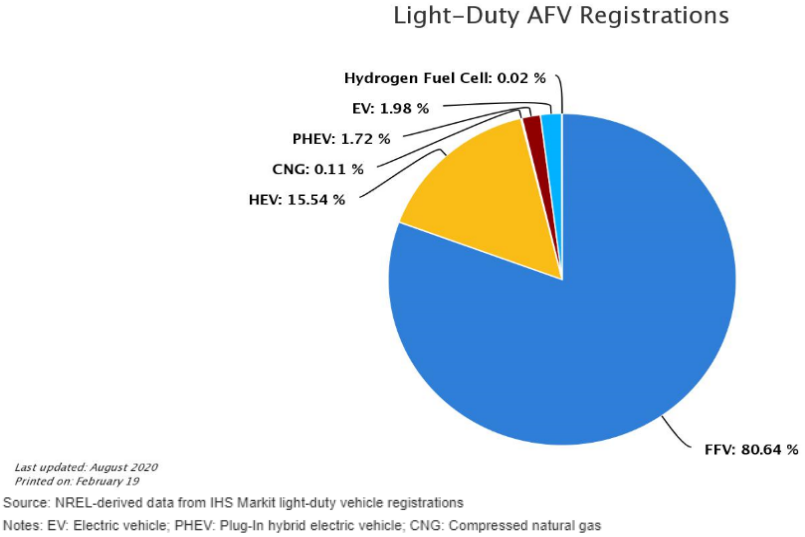
Figure 3-12

Detailed policy and procedures regarding SDDOT's continuing efforts to protect and mitigate impacts to the environment can be found in the Environmental Procedures Manual at: https://dot.sd.gov/media/documents/EnvironmentalProceduresManual.pdf

South Dakota's carbon footprint remains small, ranking 46th in the United States, according to the U.S. Energy Information Administration, further indicating the small

share South Dakota has in contributing to global warming because of greenhouse gas emissions.

Nationally there has been a push to use alternative fuel vehicles (AFVs) that is gradually reaching South Dakota to a lesser degree. Overall, hybrid (HEV) and electric vehicles (EV) remain a small percentage of the nationwide vehicle registrations at 15.5% for HEVs and 1.4% for EVs. Plug-in electric vehicles remain rare as public stations for recharging have yet to become widely available. However, there has been movement towards long-term planning and comprehensive mapping of charge facilities in the state's urbanized areas. South Dakota continues to promote production and usage of flexible fuel vehicles (FFV) using ethanol which is part of the largest sector of the AFV market.



Retrieved 02/19/2021 from: https://afdc.energy.gov/data/data/?q=hybrid Figure 3-13

Historic, Archaeological, and Cultural Resources

South Dakota has a diverse history of native cultures, early 19th century international fur trade, territorial expansion, and the nation's eventual westward settlement. The SDDOT is committed to seek ways to avoid, minimize, and mitigate any adverse effects to historic properties. Consultation with the South Dakota State Historic Preservation Office and/or applicable Tribal Historic Preservation Office(s), Archaeological Research Center is done at all levels of the transportation planning process.

The SDDOT is an active partner with the Archaeological Research Center to fulfill its mission's purpose by conducting a survey of archaeological sites in the state that exist within the vicinity of planned transportation projects. Through design modification or

mitigation efforts, events and relics of the state's history are preserved as well as promoted through this partnership.

Tribal Coordination

South Dakota works closely with its nine tribal governments during the planning and environmental assessment stages of transportation projects. Each year, SDDOT representatives formally meet with tribal representatives on the STIP. The tribes are invited yearly for participation at a SDDOT STIP / Tribal TIP meeting to receive project specific comment of projects programmed for the next four (4) years.

(Photo credit: SDDOT August 2020 Calendar)

SDDOT's coordination related to transportation planning activities include:

- Annually in June, Tribal STIP meetings are conducted where Tribal Representatives are invited to a meeting in Pierre during the STIP update process to discuss programmed projects within exterior boundaries or historic boundaries to solicit input from Tribal Transportation and Planning Officials. BIA, FHWA and FHWA-Federal Lands staff are also invited to coordinate projects of mutual interest when possible.
- Tribal leaders and Tribal Transportation and Planning staff are invited to public hearings on the four-year STIP.
- Tribal coordination on behalf of the FHWA with is facilitated with each Tribe to discuss specific concerns regarding cultural preservation and gather input to provide opportunities for Tribal Consultation in accordance with Section 106 of the Historic Preservation Act. Tribal Leaders and Tribal Transportation and Planning staff are invited to open houses and public meetings held to discuss specific projects. Written comments are encouraged when tribal members are unable to attend meetings in-person.
- Tribes are offered the opportunity to provide expertise on identifying Traditional Cultural Properties (TCP) and archaeological survey contracting services with SDDOT in scoping phase of projects, as appropriate.
- Facilitate meetings with each of the Tribes to discuss any transportation-related matters. Typically meet with staff from Tribal Transportation Planning, TERO/TECRO and THPO. May also meet with Tribal leaders or council members. Meetings are open forums on any issues and typically held in February/March/April each year.
- SDDOT participates in Tribal Safety Plan development meetings with each Tribe and provides technical assistance on safety plan coordination with the Tribes during development of the State Highway Safety Plan.

- Tribal representation on the LTAP board, TAP selection committee, member in the study group for updating the Strategic Highway Safety Plan and numerous other committees and task forces involving matters of mutual interest.
- SDDOT also consults on a project-by-project basis. This ongoing and project specific consultation process keeps communications between SDDOT and the Tribes open and enhances the opportunity for meaningful communications and coordination on transportation projects.

Chapter 4: Maintenance and Preservation

Overview

South Dakota takes pride in maintaining high standards in the quality of its roadway system. As discussed in Chapter 1, FHWA has identified ten planning factors to address throughout the entire planning process and one of the factors is to preserve and maintain the transportation system. Preservation and maintenance are not only tied to the ten planning factors but are also vital mechanisms to achieve SDDOT's vision of ***Better Lives through Better Transportation, by Being the Best***.

Maintenance

Maintenance refers to actions performed that keep a level of service that is satisfactory to the traveling public. Maintenance usually focuses on individual system features such as shoulders, roadway snow removal, patching, bridge railing, striping, guardrail, crack sealing, signage, traffic signalization, and fencing.

Maintenance actions:

- Patching on roadways
- Concrete repair on highways
- Airport runway repair
- Guardrail repair
- Minor culvert and bridge repairs
- Repairing roadways, bridges, airports, and culverts after a storm event
- Traffic signal upkeep and repair
- Roadway striping
- Repairing approaches to railroad crossings
- Repairing damages from crashes or vandalism
- Snow removal, snow fencing upkeep
- Roadway shoulder sweeping and spraying
- Signage and delineation replacement and repair
- Mowing, culvert debris removal
- Fence repair

2020 Concrete Repairs on SD85 in Lead near Homestake Mine

Preservation

Preservation refers to deliberate acts extend the service life of the transportation system, transit services, airport facilities and state-owned rail facilities, or public resources. The SDDOT uses a pavement management system and bridge management system to aid in determining cost-effective strategies that enhance long-term performance and improve safety of the state transportation network.

Examples of preservation acts:

- Resurfacing highways, local roads and airport facilities
- Rehabilitating bridges, scour protection
- Applying innovative products
- Applying surface treatments for highways and bridges

Pavement Management

The SDDOT sets pavement surface index targets and minimum pavement rating targets for the state-owned transportation system. Pavement management is a systematic process of maintaining, upgrading, and operating the existing network of pavements to optimize safe, smooth, and economic pavement conditions over the entire system within budget. The SDDOT performs annual field inspections to gather pavement condition and distress data that is fed into the pavement management system for analysis. The data is analyzed to identify treatment strategies based on current available budget and revenue projections for the next 20 years. Optimized projects are selected as candidate projects and are subject to review and inspection by SDDOT staff. The pavement management system supports data-driven decisions that lead to project selection based on need and a predicted availability of resources.

- Recommends various pavement strategies for the state highway system
- Recommends improvements to surfacing designs
- Aids in assessing future financial needs of the state highway system
- Aids management in future highway improvement strategies

South Dakota identifies pavement surface condition index (SCI) targets and target minimums for the transportation network on a cyclic basis. The rating system is 0 to 5 with 5 being a perfect roadway in new condition. Target measurements vary by roadway category.

The current state performance targets for the pavement SCI and the minimum target and pavement SCI for the categories of highways and previously reported measurements are as follows:

- **Transportation Network**—Entire roadway system owned by the South Dakota Department of Transportation.
  - Target measurement—3.90
  - Minimum target measurement—3.55
  - 2010 pavement SCI measurement—4.19
  - 2019 pavement SCI measurement—4.18

- **Interstate Highways**—Interstate 29, 90, 229 and 190. Limited access roadways that move traffic from state to state with minimal interruption.
  - Target measurement—4.20
  - Minimum target measurement—3.8
  - 2010 pavement SCI measurement—4.18
  - 2019 – 4.35

- **Major Arterials**—Roadways that move traffic from state to state that connect the major trade centers and Class 1 Cities (> 5,000 population). Examples are US83, US281, US81, US85 and US14.
  - Target measurement—4.00
  - Minimum target measurement —3.70
  - 2010 pavement SCI measurement —4.37
  - 2019 – 4.23

- **Minor Arterials**—Roadways that move traffic within the state to the major arterials and interstate highways to fulfill statutory requirements. Examples are SD115, SD44, SD65, and SD10.
  - Target measurement—3.80
  - Minimum target measurement —3.20
  - 2010 pavement SCI measurement —4.19
  - 2019 – 4.20

- **State Secondary Roadways**—Other roadways under SDDOT jurisdiction.
  - Target measurement—3.60
  - Minimum target measurement —3.00
  - 2010 pavement SCI measurement —4.00
  - 2019 – 3.94

- **Urban and Municipal Roadways**—State highways that usually feature curb and gutter and go through cities or towns. Urban roadways are roadways in communities with a population greater than 5,000 and Municipal roadways are roadways in communities with a population greater than 450 but less than 5,000. Examples are US212 through Watertown, US12 through Aberdeen, US 14 through Pierre and US83 through Herreid.
    - Target measurement—Urban—4.1, Municipal3.9
    - Minimum target measurement —Urban—3.60, Municipal—3.55
    - 2010 Urban pavement SCI measurement—3.66
    - 2010 Municipal pavement SCI measurement—3.84
    - 2019 Urban—3.88
    - 2019 Municipal—3.79

Figure 4-1, below, depicts the predicted condition of the transportation network for South Dakota through 2040.

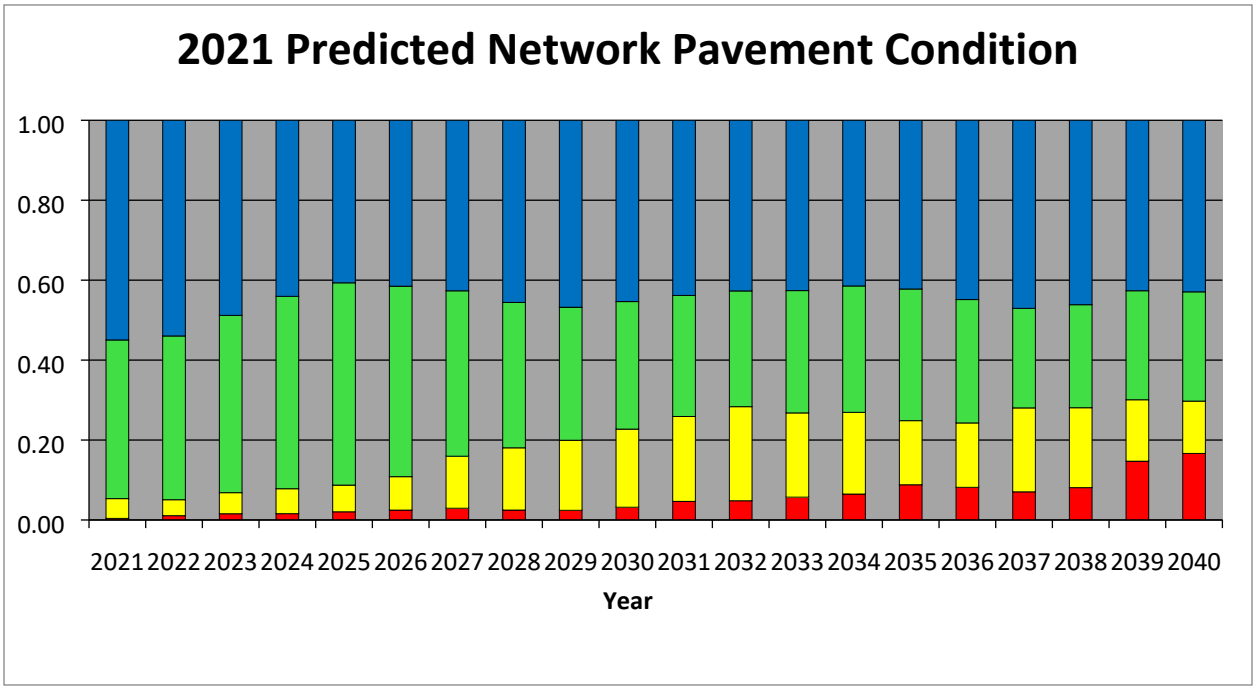


Figure 4-1

Federal funding was dramatically increased since the last Long Range Transportation Plan, which has greatly improved the predicted pavement condition and helps foster sustainability.

The costs associated with maintaining transportation systems vary. Figure 4-2 shows the benefits of systemic analysis and cost comparisons associated with preservation of the transportation system. There are quantitative relationships between the different

types of preservation acts as they relate to condition. By doing the right treatments at the right time, the SDDOT maximizes funding to keep systems functioning at optimal levels. Once a treatment is applied, the condition resets, thereby extending the life of the asset at the highest rate of investment.

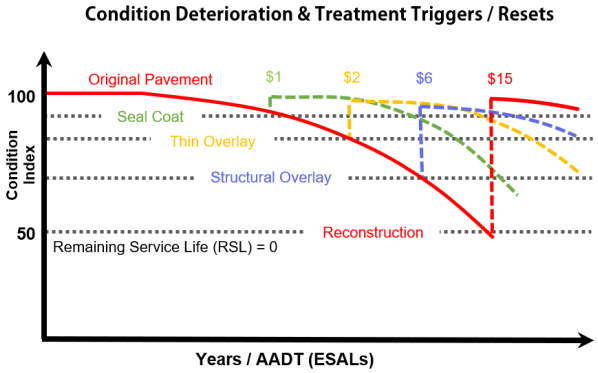


Image adapted from Applied Pavement Technology

Figure 4-2

Bridge Management

South Dakota utilizes a bridge management system that models future condition and works to optimize our bridge inventory within budget constraints. State bridge inspectors inspect most bridges on the state inventory every two years. All major Missouri River bridge crossings are inspected every year, except the SD 19 bridge over the Missouri River which was built in 2001. Bridges and culverts that are greater than 20 feet in length along centerline of roadway are included in our bridge management system, SDDOT inventory, and are submitted annually as part of the National Bridge Inventory.

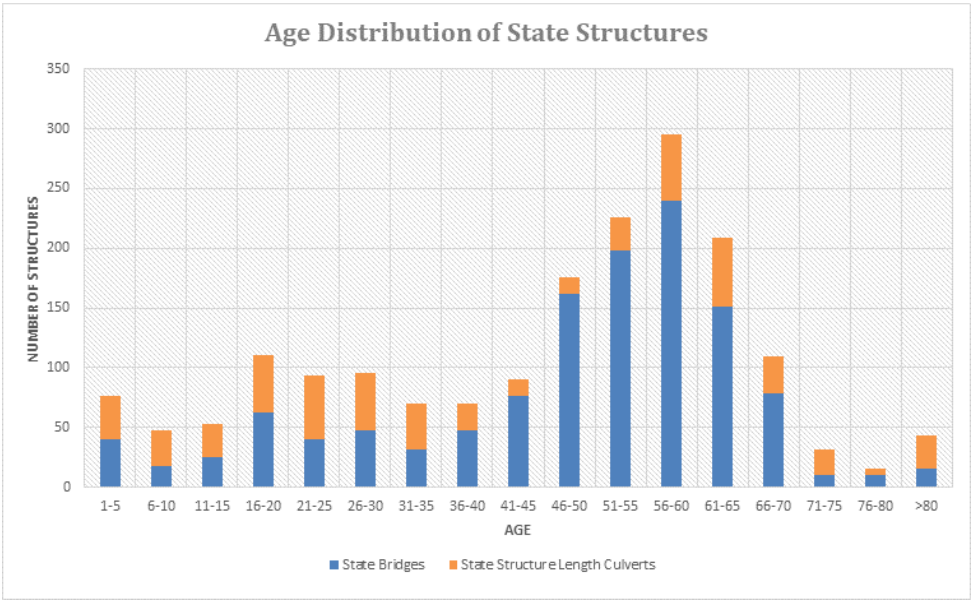


Figure 4-3

The design lifespan of new bridge construction is now 75 years, which is up from 50 years when most of the current inventory was originally constructed. Figure 4-3 shows the age of the structures in the SDDOT inventory. More structures were originally constructed between 45 and 65 years ago and are still in our inventory than any similar time period. SDDOT has worked at preserving our bridge assets so the timeframe of the replacement bubble is spread out more than that of the original construction. This is the key driver of the preservation aspect of the bridge management system.

Figure 4-4 shows the 10-year historical and 10-year projected percentage of bridges in good or fair condition. Bridge condition can be poor, fair, or good and is determined from data collected at bridge inspections. The target of the bridge inventory reported in fair or better condition is 95%; and was last measured at 97.6%. SDDOT projects to remain above this metric for the next 10 years. By programming preservation measures like deck overlays and zone painting projects, the state continues to maintain its bridge inventory above this target.

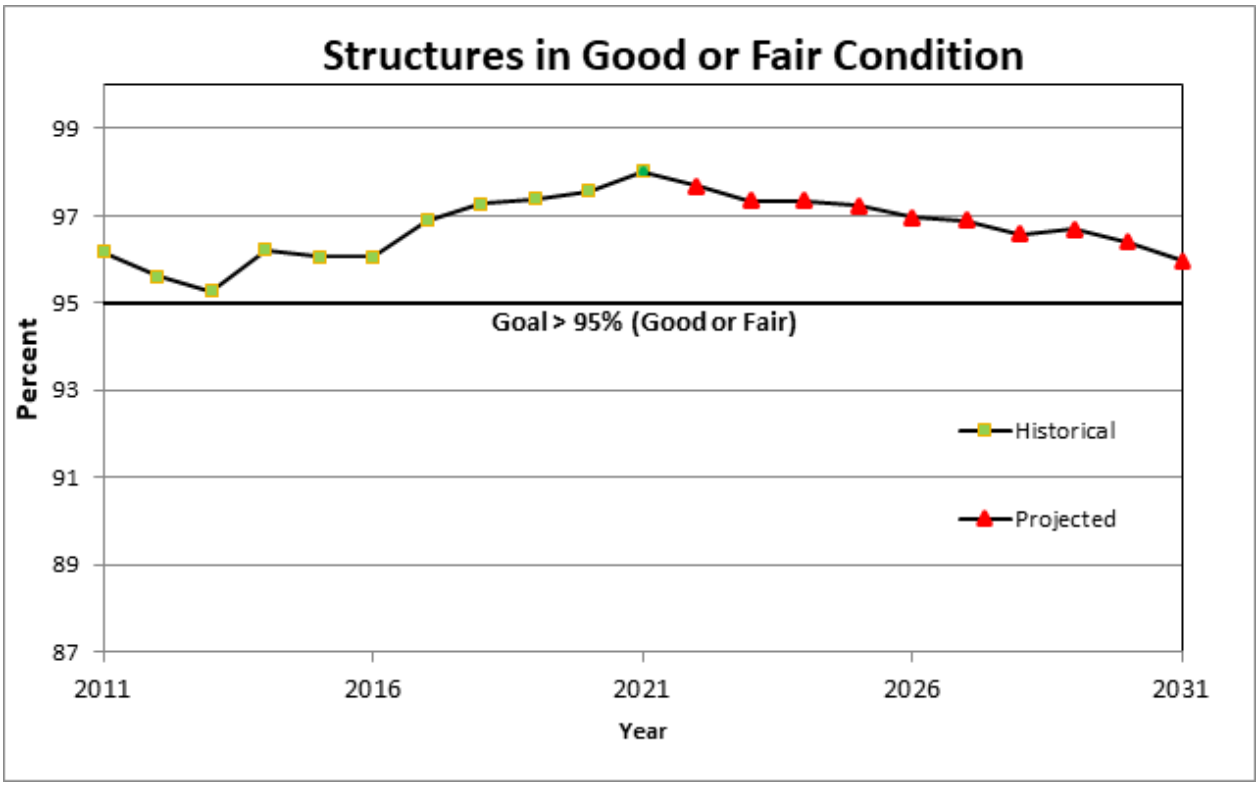


Figure 4-4

Capacity

Table 4-1: Level of Service	
Level of Service	**Description**
A	Free flow with low volumes and high speeds.
B	Reasonably free flow, but speeds beginning to be restricted by traffic conditions.
C	In stable flow zone, but most drivers are restricted in the freedom to select their own speeds.
D	Approaching unstable flow; drivers have little freedom to select their own speeds.
E	Unstable flow; may be short stoppages
F	Unacceptable congestion; stop-and-go; forced flow.

Table 4-1

In addition to the Department's pavement and bridge management systems, planning activities also evaluate operation of the transportation system, such as capacity. Traffic forecasts are one factor to consider when planning and designing roadway projects. SDDOT considers operational performance based on existing and projected traffic conditions, current and proposed land use, context, and agency transportation planning goals along with the input of a wide cross section of project stakeholders during the project planning process.

Level of Service (LOS) ratings are widely used in transportation planning to evaluate problems and potential remedies in highway systems. LOS, which categorizes traffic flows based on vehicle speed, density, and congestion, is a qualitative indicator of how well a facility is performing from the **traveler's perspective**. Table 4-1 contains descriptions of the Levels of Service as defined by American Association of State Highway and Transportation Officials (AASHTO). The SDDOT established design guidelines based on LOS in relationship to the roadway's functional classification, as shown in Table 4-2 below.

SDDOT Level of Service Guidelines

Functional Classification[1]	Highway Type				
	Rural Level	Rural Rolling	Rural Mountainous	Urban[2] Desirable	Urban[2] Minimum
Freeways (Interstate & Expressways, mainline, merge points, diverge points, and weave area)	B	B	C	B	C
Principal Arterial	B	B	C	C	D
Minor Arterial[3]	B	B	C	C	D
Collector[3]	C	C	D	C	D

[1] For functional classifications, refer to the current edition of the *SDDOT Highway Needs and Project Analysis Report*.
[2] Urban includes highways within the city limits of a town or city with consideration of the growth areas beyond city boundaries. The use of level of service D should only be considered in heavily developed (fully built out) sections of metropolitan areas.
[3] Two lane Minor Arterials & Collectors should be considered Class II highways when utilizing the current edition of the *HCM*.

Table 4-2

See Chapter 15 of the SDDOT Road Design Manual at : https://dotfiles.sd.gov/rd/rdmch15.pdf for further design criteria related to LOS.

Traditional design elements that increase capacity and improve LOS are:

- Adding through, passing, and climbing lanes
- Adding turn lanes at intersections
- Limiting access
- Adding medians

SDDOT has also implemented innovative design solutions to address capacity at key interchanges at I90/Lacrosse in Rapid City, I29/41st St in Sioux Falls, and the I90/SD11 interchange in Brandon. These were the state's pioneer uses of a diverging diamond interchange (DDI) that aim to provide the following benefits and advantages:

- ***Safety*** – Reduces the number of ways vehicles can collide by almost half (14 compared to 26 for a conventional diamond interchange).
- ***Greater capacity and efficiency*** – Accommodates more traffic than conventional designs. Drivers make free-flow right and left turns on to the major freeway.
- ***Easy navigation*** – Guides drivers with overhead signs, pavement marking, and traffic signals.
- ***Meets the needs of all road users*** – Accommodates large trucks, pedestrians and bicyclists.

Capacity projects, as high-dollar investments, are prioritized with preservation and maintenance projects for inclusion in the Statewide Transportation Improvement Program. The SDDOT strives to actively pursue additional federal funding for this scale of reconstruction and has been successful by using innovative design solutions to secure limited resources as a partner with multiple priorities.

Check it out!

DDI Project websites at:
http://www.i90lacrosseddi.com/index.html
http://www.41ststudy.com/index.html

Challenges

South Dakota's transportation network was developed over the last century using a variety of funding from private partnerships and public resources. The transportation system consists of Interstate, state highways, local roads, airports, railways and transit services. Overall, needs have shifted from establishment of the transportation system to preservation. While this fundamental shift has transpired, the SDDOT continues to face the following challenges:

- Aging highways and bridges
- Limited revenue and uncertain timing of federal revenue
- Increased construction and operating costs
- Limited heavy construction contractor availability
- Urban growth surpassing traffic capacity
- Underutilized or unavailable transit services
- Property value impacting right of way costs; especially southeast SD
- Flooding, freezing, snow drifting, and other natural disasters

Of these, financing South Dakota's transportation needs with limited revenues continues to be the major concern. With an aging transportation system, maintenance and preservation tactics change to meet varied and increased need. Costs continue to increase while revenues for the federal highway trust fund struggle to keep up. Managing a transportation system with limited revenue has impacted the local governments ability to maintain and preserve their infrastructure as well. Excessive rain events in eastern South Dakota are of note because flooding accelerated maintenance needs as well as delayed planned construction intended to bolster the transportation network. In many cases, cities and counties have deferred maintenance and preservation actions due to lack of funding for long-term solutions in their immediate response to flooding.

When maintenance and preservation activities are not completed, the transportation system deterioration accelerates while the cost of repair or replacement increases. Without adequate funds to maintain and preserve the local network, local governments cannot keep pace with well-planned maintenance and preservation methods. SDDOT partners where possible to aid in statewide transportation projects to ensure there is an integrated transportation system throughout South Dakota.

Activities

South Dakota is committed to maintaining and preserving the transportation system and has identified several important activities to address challenges:

- Use the pavement management system to determine the most cost-effective measures to maintain or exceed the goals and minimums set for the transportation network
- Use the bridge management system to determine the most cost effective measures to maintain the bridge inventory
- Preserve South Dakota's state trunk highway system infrastructure
- Use of asset management techniques to affirm adequate investment or removal of transportation features to ensure value to our customers

The SDDOT Division of Operations adopted pavement preservation guidelines to provide information on the use of pavement preservation strategies for maintaining pavement condition consistent with the pavement surface condition targets set by the SDDOT. The department's policies and procedures regarding the use of pavement preservation techniques are also provided in the pavement preservation guidelines document. Pavement preservation is a cost effective way of managing assets. The document defines various types of pavement preservation strategies to aid in determining the best application for each unique situation.

The SDDOT will continue to use the pavement management and bridge management system to aid staff in identifying preservation needs of the state trunk system. These systems are efficient tools to meet the performance targets.

Through a focus on asset management, the department can determine the existing and future value of various transportation assets. This analysis results in identification of funding levels needed to maintain various condition levels and where elimination of assets is viable.

Chapter 5: Active Transportation

Introduction

Walking and bicycling are proven ways to improve the quality of life for the citizens of South Dakota, providing an essential option for people to travel to and from work, school, and countless everyday destinations. As the demand increases for walking-friendly Active Transportation facilities, South Dakota is committed to expanding opportunities and further improving the conditions for walking and bicycling across the state. A review of the contextual elements shaping the current state of Active Transportation in South Dakota serves as the foundation for analysis and recommendations as set forth in this chapter.

The SDDOT strives to improve the usage, availability, mobility, accessibility, and safety for all users on Active Transportation facilities. A practice of the department is to promote the participation of pedestrian and bicycle organizations in the planning process. It is important that all stakeholders, including pedestrians and bicyclists, participate in the development of the STIP and Statewide Long Range Transportation Plan.

Facts

To increase connectivity, pedestrian and bicycle pathway projects are coordinated with other intermodal planning components including the State Trunk Highway System. Except where specifically prohibited, bicycles may be ridden on any highway in South Dakota on the right hand shoulder with the flow of traffic, including along the Interstate System.

From 2013 to 2017, there was a total of 178 severe pedestrian crashes and 46 severe bicyclist crashes. Of the 178 severe pedestrian crashes, 32% were on State roads, 14% were on county roads and 54% were on city roads. Figure 5-1 shows six intersection types and how they compare for pedestrian crashes.

Intersection Type -
Severe Pedestrian Crashes

	Fatal	Serious Injury	Percentage of Severe Pedestrian Crashes	Percentage of All Severe Crashes
Driveway access	3	3	3%	4%
Four-way intersection	1	25	15%	16%
Interchange area	4	0	2%	4%
Intersection-related	3	27	17%	5%
Non-junction *	24	78	57%	64%
T-intersection	3	7	6%	6%

*Non-junction is a catch-all type for crashes that were not coded to any intersection

Figure 5-1

The four major emphasis areas related to severe pedestrian crashes are young drivers, drugs and alcohol, intersections, and older drivers. Intersections have the highest percentage of overall severe pedestrian crashes. This is illustrated in Figure 5-2, which outlines all of the emphasis areas related to severe pedestrian crashes.

Emphasis Area - Severe Pedestrian Crashes

	Severe Pedestrian Crashes		Percentage of Severe Pedestrian Crashes	Percentage of All Severe Crashes	Percentage Point Difference
	Fatal	Serious Injury			
Young Drivers	6	24	17%	5%	12% ↑
Drugs and Alcohol	22	42	36%	25%	11% ↑
Intersections	7	59	37%	27%	10% ↑
Older Drivers	7	35	24%	19%	5% ↑
Bicyclists	0	0	0%	1%	-1% –
Distracted or Drowsy	2	3	3%	8%	-5% ↓
Speeding and Aggressive Drivers	1	6	4%	24%	-20% ↓
Motorcycles	0	1	1%	24%	-23% ↓
Unbelted Vehicle Occupants	1	1	1%	31%	-30% ↓
Lane Departures	6	11	10%	59%	-49% ↓

Figure 5-2

Figure 5-3 is a highlight table showing the time of day and month in which severe pedestrian crashes occur, green being the fewest on up to orange being the most in that time period.

Time of Day and Month - Severe Pedestrian Crashes

Graduated Scale
0 Crashes
10 Crashes

Time	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	% of Crashes
Midnight - 3:00 AM	0	2	3	1	2	1	1	3	0	1	1	1	16	9.0%
3:00 AM - 6:00 AM	0	0	0	2	1	0	1	0	1	0	0	1	6	3.4%
6:00 AM - 9:00 AM	2	0	3	0	1	1	1	0	3	0	3	2	16	9.0%
9:00 AM - Noon	1	0	0	1	2	2	10	2	0	2	3	2	25	14.0%
Noon - 3:00 PM	1	2	0	2	0	2	1	2	1	1	0	2	14	7.9%
3:00 PM - 6:00 PM	2	1	2	1	2	1	2	5	5	4	2	5	32	18.0%
6:00 PM - 9:00 PM	4	3	1	0	3	2	2	2	8	4	2	5	36	20.2%
9:00 PM - Midnight	2	0	1	7	0	4	3	4	5	4	1	2	33	18.5%
Total	12	8	10	14	11	13	21	18	23	16	12	20	178	
% of Crashes	6.7%	4.5%	5.6%	7.9%	6.2%	7.3%	11.8%	10.1%	12.9%	9.0%	6.7%	11.2%		

Figure 5-3

Of the 46 severe bicyclist crashes, 17% were on state roads, 11% were on county roads and 72% were on city streets. Figure 4 shows seven intersection types and how they compare for bicyclist crashes.

Intersection Type - Severe Bicyclist Crashes

	Fatal	Serious Injury	Percentage of Severe Bicyclist Crashes	Percentage of All Severe Crashes
Alley intersection	0	3	7%	0.1%
Bike path or trail-related	0	1	2%	0.0%
Driveway access	2	6	17%	0.2%
Four-way intersection	0	9	20%	0.3%
Intersection-related	0	10	22%	0.3%
Non-junction	1	11	26%	0.3%
T-intersection	0	3	7%	0.1%

Figure 5-4

The four major emphasis areas related to severe bicyclist crashes are young drivers, intersections, older drivers, and lane departures. Intersections have the highest percentage being the primary factor involving severe bicyclist crashes with young drivers in a close second. Figure 5-5 outlines the emphasis areas related to severe bicyclist crashes.

Emphasis Area - Severe Bicyclist Crashes

	Severe Bicyclist Crashes		Percentage of Severe Bicyclist Crashes	Percentage of All Severe Crashes	Percentage Point Difference
	Fatal	Serious Injury			
Young Drivers	0	19	41%	19%	22% ↑
Intersections	0	22	48%	27%	21% ↑
Older Drivers	1	13	30%	19%	11% ↑
Pedestrians	0	0	0%	5%	-5% ↓
Distracted or Drowsy	0	1	2%	8%	-6% ↓
Drugs and Alcohol	0	3	7%	25%	-18% ↓
Speeding and Aggressive Drivers	0	1	2%	24%	-22% ↓
Motorcycles	0	0	0%	24%	-24% ↓
Unbelted Vehicle Occupants	0	0	0%	31%	-31% ↓
Lane Departures	1	11	26%	59%	-33% ↓

Figure 5-5

For informational purposes, Figure 5-6 is a highlight table showing the time of day and month in which severe bicyclist crashes occur.

Time of Day and Month - Severe Bicyclist Crashes

Time	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	% of Crashes
Midnight - 3:00 AM	0	0	0	0	1	0	0	0	0	0	0	0	1	2.2%
3:00 AM - 6:00 AM	0	0	0	0	0	1	0	0	1	0	0	0	2	4.3%
6:00 AM - 9:00 AM	0	0	1	0	1	0	0	0	3	0	0	0	5	10.9%
9:00 AM - Noon	0	0	1	1	0	3	2	3	0	0	0	0	10	21.7%
Noon - 3:00 PM	0	0	1	0	1	1	0	1	1	0	0	0	5	10.9%
3:00 PM - 6:00 PM	1	0	0	1	1	2	2	0	0	2	1	1	11	23.9%
6:00 PM - 9:00 PM	0	0	2	0	0	1	3	2	1	0	0	0	9	19.6%
9:00 PM - Midnight	0	0	0	0	0	1	1	0	0	1	0	0	3	6.5%
Total	1	0	5	2	4	9	8	6	6	3	1	1	46	
% of Crashes	2.2%	0.0%	10.9%	4.3%	8.7%	19.6%	17.4%	13.0%	13.0%	6.5%	2.2%	2.2%		

Figure 5-6

The SDDOT created a recommendation guide known as the Safe Transportation for Every Pedestrian (STEP) for uncontrolled and mid-block crossings for bicyclists and pedestrians. This guide entails the different traffic measures that can be implemented to enhance safety at uncontrolled and mid-block crossings such as Rectangular-Rapid Flashing Beacons, Road Diets, bump outs, etc. The guide may be found at: https://dot.sd.gov/media/documents/STEPGuide.pdf

The Department of Game, Fish, and Parks (GF&P) funds many projects through the Land and Water Conservation Fund (LWCF) which began in 1965. The funds can be used to develop outdoor recreation plans and to construct hiking and bicycling trails. Under this Federal program, LWCF would match 50 percent of the cost of developing these projects, usually for park amenities such as playground equipment, pools, and restrooms. When used for trail projects it may cause environmental issues for future projects. In practice, the SDDOT more often uses the FHWA funded Recreational Trail Program as a funding source for Active Transportation projects.

Cross country bikers use the shoulders on the highway systems to trek across the state. Since 2009, South Dakota has increased the mileage of shoulders on the state highway systems by 51.1 miles. This included shoulders on roadways that were non-existent and then expanded. Map 5-1 shows the locations of bicycle friendly routes and corresponding average daily traffic (ADT).

Pedestrian crashes in South Dakota have remained constant over the past ten years. Figure 5-7 illustrates the severe pedestrian crashes for South Dakota between 2008-2018. Severe bicyclist crashes in South Dakota have steadily decreased over the past ten years. Figure 5-8 shows the severe bicyclist crashes for South Dakota between 2008-2018.

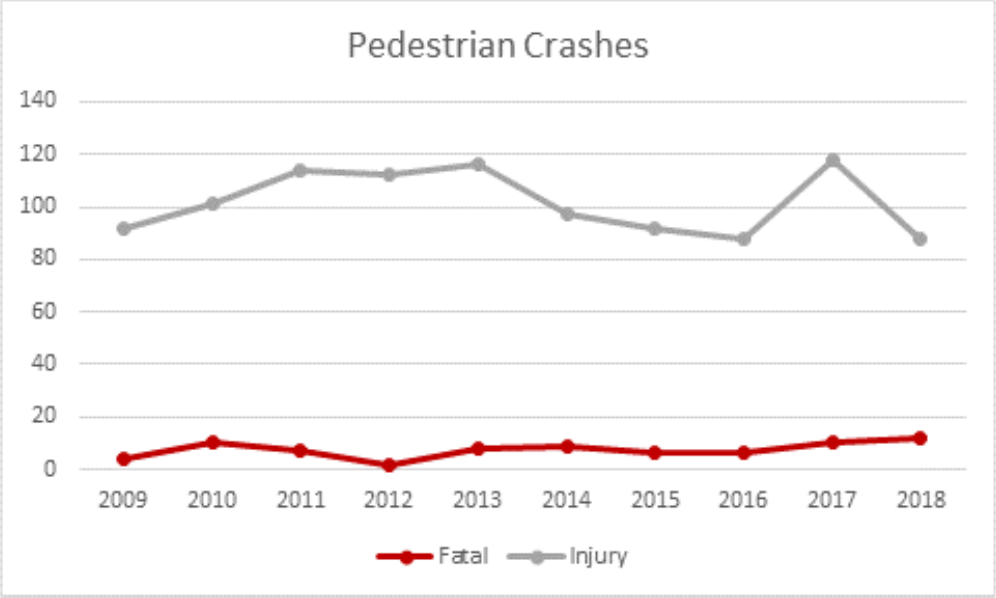


Figure 5-7

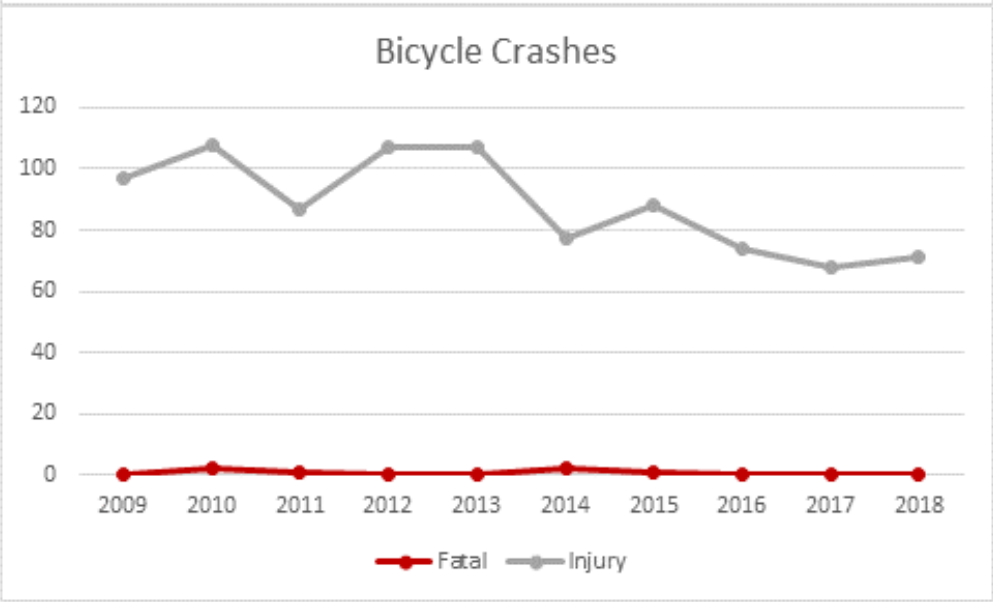


Figure 5-8

The Transportation Alternatives (TA) Program is a competitive project selection program that awards funding to selected communities to provide alternative transportation options. Since the inception of the TA program in 2013, the South Dakota Department of Transportation has awarded more than $14.7 million worth of Federal funds and more than $22 million worth of TA projects. SDDOT receives approximately $5.3 million annually for active transportation projects. Half of the apportionment is split between urban and rural communities.

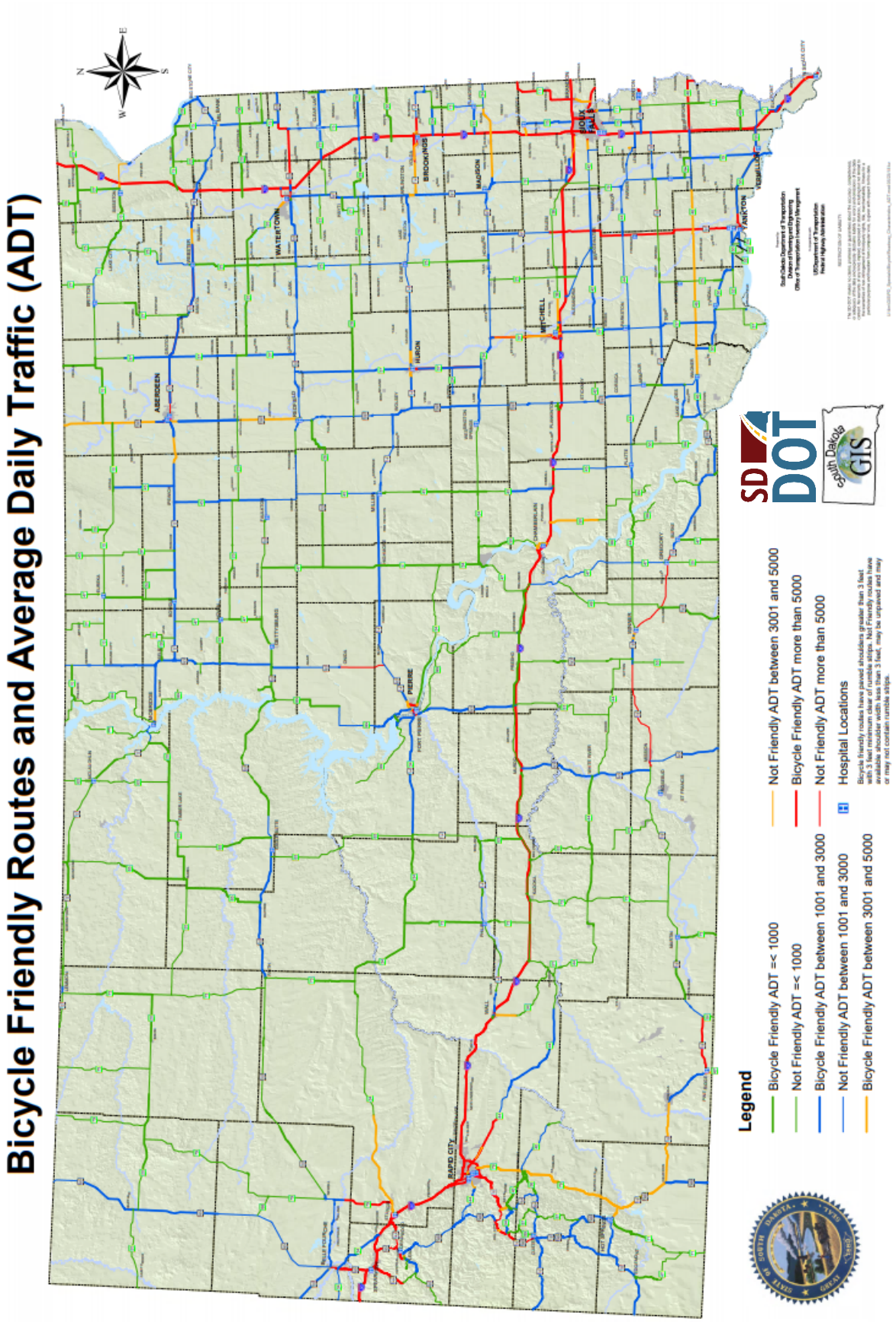
Maps 5-1 and 5-2 on the following pages depict the locations of existing bicycle-friendly routes and TA projects that have been awarded funding since 2013. The route map can also be found at: https://dot.sd.gov/media/documents/roadwaychar.pdf

Challenges

Despite the advantages of walking and bicycling for transportation in South Dakota, challenges exist. Some challenges faced in South Dakota include:

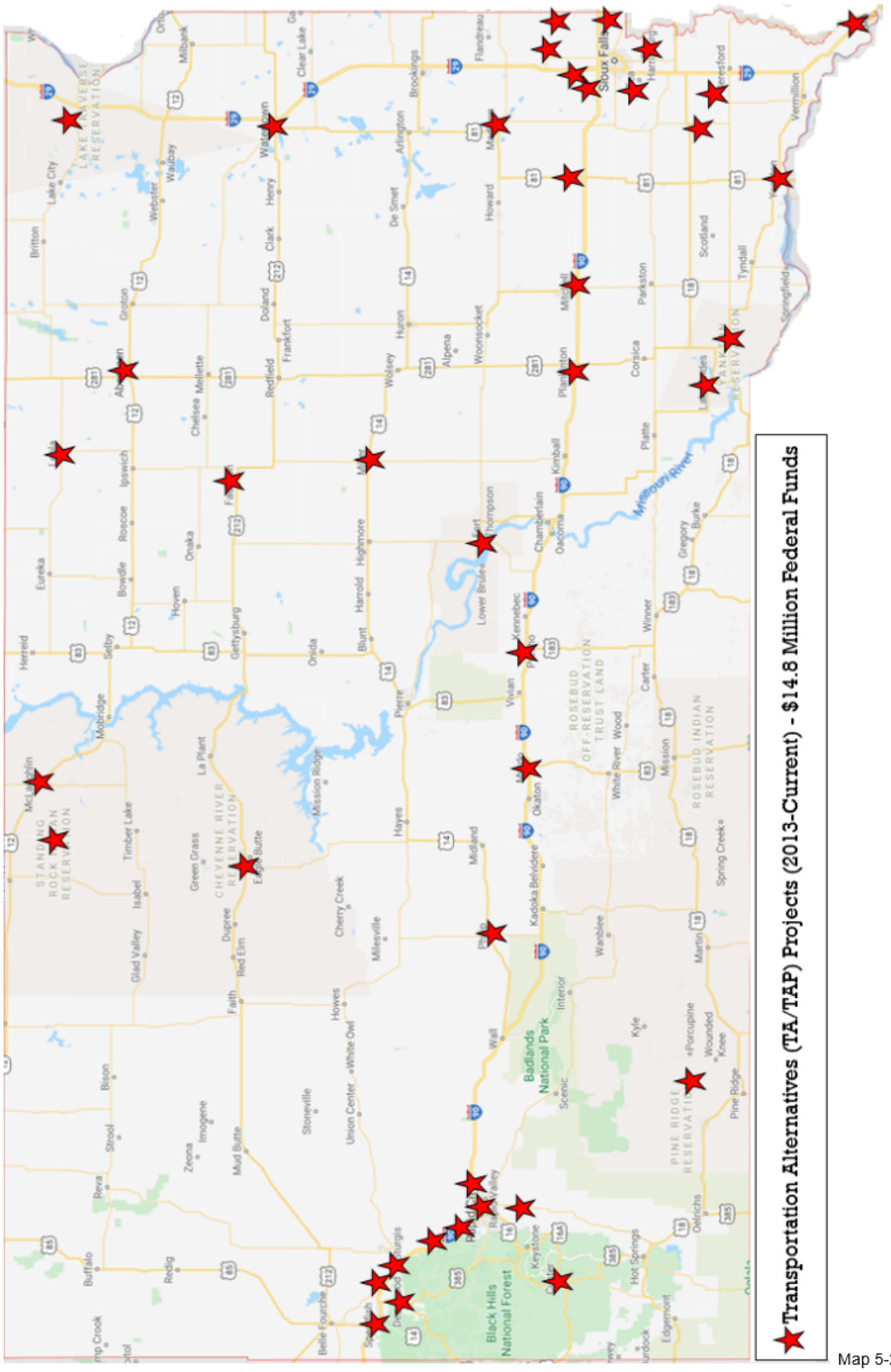
- Lack of infrastructure
- Funding
- Extreme seasonal weather
- Variances in user risk tolerance
- Widespread lack of knowledge of bicycle and pedestrian laws
- Rider or driver distractions, impairments, or other risks
- Lack of data on bicyclist and pedestrian counts
- Coordination between regional, local and DOT staff on needs, issues, and concerns
- Low population density
- Significant distance between large population centers

South Dakota's transportation system is extensive and is owned and maintained by multiple entities, creating gaps in bicycle and pedestrian facilities. Limited funding for bicycle and pedestrian facilities allows for the slow development in infrastructure. A greater awareness and use of standard design guidance for the development of active transportation facilities would help with keeping the development of these facilities consistent while fostering the development of active transportation facilities. Collaboration across jurisdictions is needed to educate the users of all transportation modes of the rules and regulations pertaining to bicyclist and pedestrians. Analyzing user behavior and counts on current active transportation facilities can aid in future design and development as well as public awareness.


Bicycle Friendly Routes and Average Daily Traffic (ADT)
Legend
Bicycle Friendly ADT =< 1000
Not Friendly ADT =< 1000
Bicycle Friendly ADT between 1001 and 3000
Not Friendly ADT between 1001 and 3000
Bicycle Friendly ADT between 3001 and 5000
Not Friendly ADT between 3001 and 5000
Bicycle Friendly ADT more than 5000
Not Friendly ADT more than 5000
Hospital Locations
Bicycle friendly routes have paved shoulders greater than 3 feet with 3 feet minimum clear of rumble strips. Not Friendly routes have available shoulder width less than 3 feet, may be unpaved and may or may not contain rumble strips.
ABERDEEN
WATERTOWN
BROOKINGS
MADISON
SIOUX FALLS
YANKTON
HURON
MITCHELL
PIERRE
RAPID CITY

Map 5-1

Transportation Alternatives Projects



Map 5-2

Chapter 6: Funding

Introduction

To implement the goals and objectives in South Dakota's statewide transportation plan, funding must be adequate, sustainable and equitable for all users. The future brings funding challenges that are different than in the past and we must look at different ways to fund transportation.

South Dakota's present transportation needs exceed the funding that is available. South Dakota relies heavily on Federal funding to provide dollars to maintain the transportation system and provide transit services. Federal dollars usually pay approximately 80 percent of a Federal aid eligible projects and the remaining portion is a local match. State gas tax and motor vehicle excise tax dollars provide the 20 percent match to the Federal funding and fund maintenance of the transportation system.

Funding

There are several different funding mechanisms that can be used to fund transportation and South Dakota's funds come from the following sources:

- Federal funding
- State revenue
- Local funding

Forecast of Federal Funding

The Federal Highway Trust Fund no longer generates adequate funding to pay for the Federal Transportation Program. Congress transfers funds from the general fund to supplement the shortfall. In 2020, the FAST Act expired but was extended until September 30, 2021.

When forecasting federal funding, we are projecting only an inflationary increase for the next 20 years. Once Congress passes a new transportation bill, the Department will be better informed to identify future funding for the highway program.

Figure 6-1 depicts the actual Federal Apportionments from Fiscal Year (FY) 1999 to FY 2020 and the projected Federal apportionments South Dakota will receive through FY 2040. South Dakota is projecting no increases in the federal funding apportionment over the next 20 years but does account for inflation in the table

below. It must be noted that actual obligation authority, what the department is allowed to spend, is less than apportioned funds.

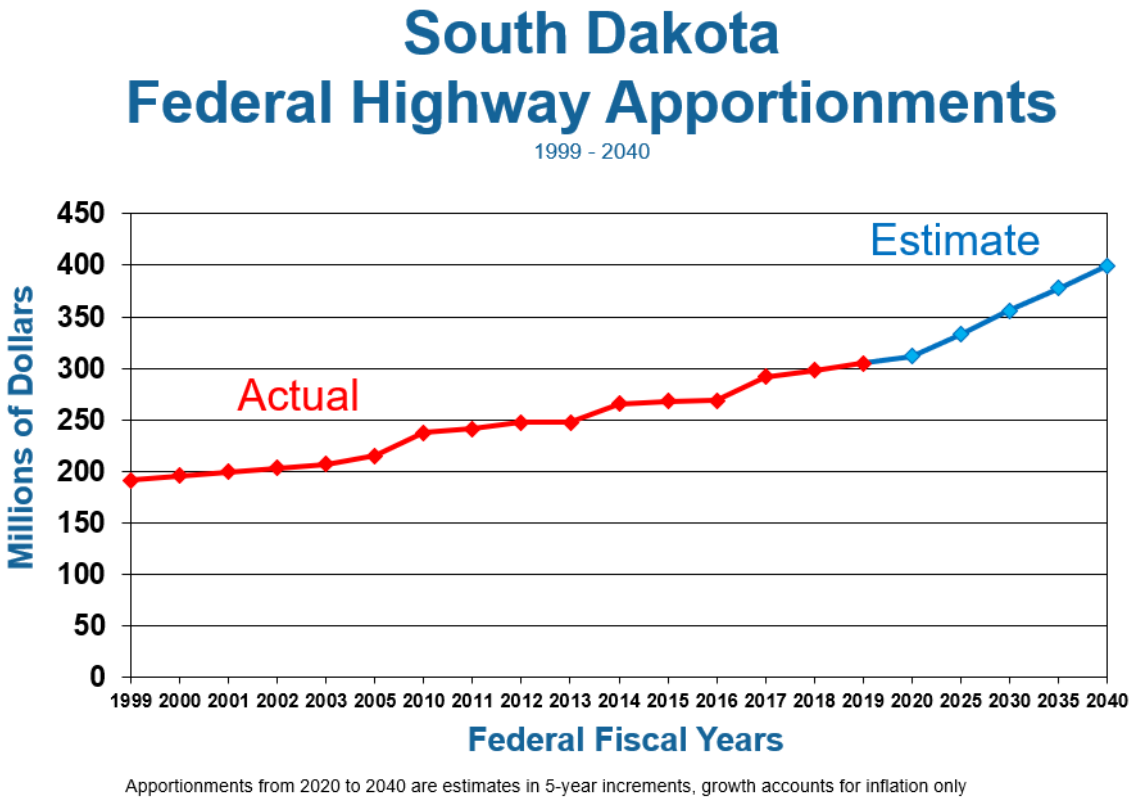


Figure 6-1

State Transportation Revenue

The majority of the State's transportation revenue is generated by motor fuel taxes and motor vehicle excise tax. The state tax funds along with the federal funds make up the funding South Dakota uses to maintain and preserve the transportation system. South Dakota identifies transportation and transit projects in the 4-year Statewide Transportation Improvement Program (STIP). The STIP is required to be fiscally constrained and is updated every federal fiscal year. State revenue and federal funding commitments for the STIP are provided to show funding is available to build the transportation projects.

The management strategies must be based in financial reality. The financial flexibility allowed under federal law is restricted by realistic expectations of future funding. The funding projections in this chapter are based on the projected amount of revenue the SDDOT will have for highway construction and maintenance. The short-term funding for the STIP is shown in Figure 6-2. This

figure projects moderately stable funding for highway construction over the next four years.

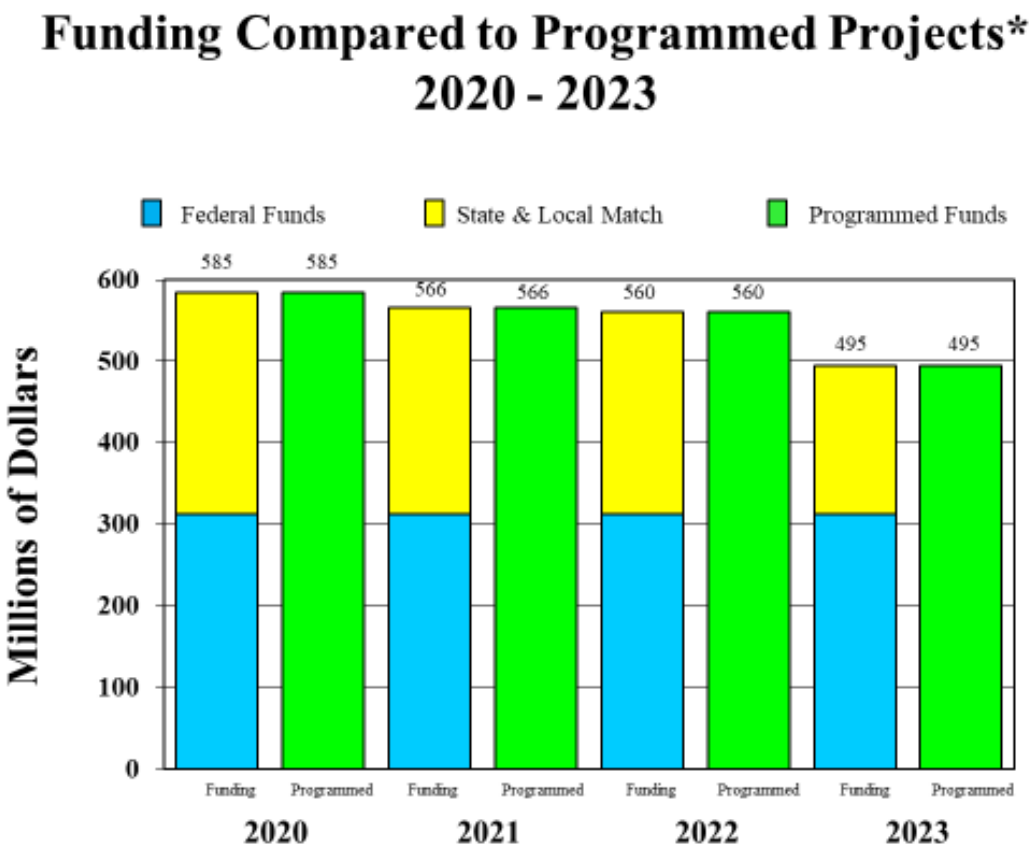


Figure 6-2

Forecast of State Highway Revenue

The required state highway revenues to match federal funds are difficult to predict since we do not know the level of future federal funding and the state highway expenditures for the next twenty years. In 2015, South Dakota raised the gas tax by 6 cents per gallon from 22 cents per gallon to 28 cents per gallon and the excise tax on new vehicles by one percent. Based on the historical collection of state highway revenues over the last ten years it is anticipated that revenue will increase over the next 20 years (See Figure 6-3) but may not be enough to support the needs. Depending on the level of federal funding, solutions to finance the needs may need to be addressed by the legislature in the future.

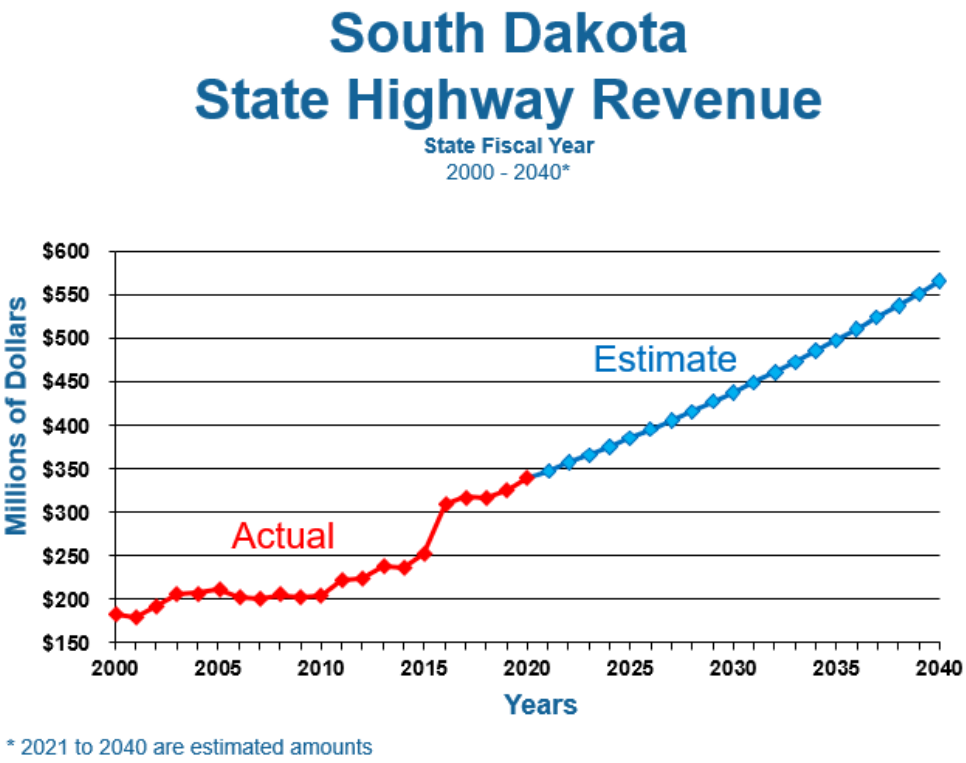


Figure 6-3

This revenue projection, along with the estimates of federal apportionments, is used as a guide to decision-makers to predict what fiscal possibilities may be for the next twenty years. These are assumptions and general resource estimates must be updated as accurate figures become available because of their impact on decision-making.

The SDDOT explores more efficient and alternative fuels, faster rails, or new intermodal technologies and works to support legislative actions that implement efficient solutions to transportation problems. Truck platooning has become legal in South Dakota because of such efforts. When new technologies become available, they need to be justified for efficiency and life cycle costs. Autonomous and connected vehicles appear to provide tremendous hope for safety and capacity improvements.

South Dakotans realize in this sparsely populated state, the marketing lifeline of agriculture and commerce is transportation. When necessary, the citizens have proven they are willing to increase revenues to keep these lifelines operating. The SDDOT will continue to analyze the level of investment that is necessary to preserve the existing intermodal system and sustain the necessary future transportation system needs.

Chapter 7: System Performance Report

Objectives and Targets, Performance Gap Assessment

To help accomplish SDDOT's mission "to efficiently provide a safe and effective public transportation system", the SDDOT has set targets for pavement and structure condition, travel time reliability, freight reliability, and safety in consideration of customer needs and expectations, analysis of asset condition, and anticipated funding levels.

Gap analysis is used to identify deviations between current and desired asset conditions. This knowledge is used to prioritize tasks and take appropriate actions based upon available funding. Funding may need to be reallocated to meet department condition performance targets. If the current or projected performance falls short of the targets, there is a performance gap. If the forecast performance exceeds the target, there is a projected performance surplus. Currently, all gap analyses are clouded by volatile federal funding uncertainty. There is substantial risk that performance gaps would change if the federal funding does not reach forecasted amounts.

Performance Measures and Targets

In 2018, SDDOT developed baseline performance measurement targets to further establish performance based management of its resources and began performance gap assessments accordingly. These data-driven measures help promote a managed approach as mandated by 23 CFR Part 490 National Performance Management Measures. A biennial report was submitted by all state DOTs in 2020 to further define or adjust targets reported in the baseline effort, South Dakota's are shown in Figure 7-1. In South Dakota, the Rapid City Area MPO, Sioux Falls Area MPO has adopted the SDDOT performance measures rather than opting to develop their own.

Summary of Performance Measures and Targets

Performance Measures	Baseline	2-Year Condition/ Performance	2-Year Target	4-Year Target	4-Year Adjustment
Percentage of Pavements of the Interstate System in Good Condition		75.8%		62.6%	
Percentage of Pavements of the Interstate System in Poor Condition		0.0%		2.4%	
Percentage of Pavements of the Non-Interstate NHS in Good Condition	56.5%	60.5%			
Percentage of Pavements of the Non-Interstate NHS in Good Condition (Full Distress + IRI)		55.3%	41.5%	41.5%	
Percentage of Pavements of the Non-Interstate NHS in Poor Condition	6.4%	5.6%			
Percentage of Pavements of the Non-Interstate NHS in Poor Condition (Full Distress + IRI)		0.6%	1.5%	1.5%	
Percentage of NHS Bridges Classified as in Good Condition	27.2%	26.6%	22.0%	20.0%	
Percentage of NHS Bridges Classified as in Poor Condition	1.3%	2.5%	5.0%	5.0%	
Percent of the Person-Miles Traveled on the Interstate That Are Reliable	99.8%	99.9%	90.0%	90.0%	
Percent of the Person-Miles Traveled on the Non-Interstate NHS That Are Reliable		92.8%		85.0%	
Truck Travel Time Reliability (TTTR) Index	1.14	1.19	1.50	1.50	

Figure 7-1

Safety

The Highway Safety Improvement Program (HSIP) Final 23 Part 490 requires established targets for five (5) performance measures based on five-year rolling averages for:

- Number of Fatalities
- Fatality Rate
- Number of Serious Injuries
- Serious Injury Rate
- Non-Motorized Fatalities and Serious Injuries

The SDDOT develops safety targets in these categories that are customarily adopted by the MPOs on an annual basis through resolutions approved by their respective policy boards. Figure 7-2 illustrates the Calendar Year (CY) 2020 HSIP safety targets as developed and adopted.

Number of Fatalities	125.2
Number of Serious Injuries	656.7
Fatality Rate	1.240
Serious Injury Rate	6.630
Total Number of Non-Motorized Fatalities and Serious Injuries	40.0

Figure 7-2

The CY 2019 targets were assessed and SDDOT met or made significant progress towards meeting its safety performance targets. For more information on the calculations and data used for computing the target achievement assessment, refer to guidance: FHWA Procedure for Safety Performance Measure Computation and State Target Achievement Assessment. Annual results from the State safety performance target achievement assessment will be available on the FHWA Transportation Performance Management website.

Pavement Condition

The SDDOT bases its performance measure targets for overall pavement condition on the Surface Condition Index (SCI), calculated as a composite of roughness, rutting, faulting, and distress indices on a scale of 0 to 5. The 10-year target goal and minimum

value for the statewide highway network are 3.90 and 3.55, respectively. With current anticipated funding, SDDOT can exceed the minimum value but cannot achieve the target value. The gap analysis for individual funding categories (Table 7-1) shows that the average SCI of pavements in every funding category are expected to decline significantly from current values.

Although most categories of roadways exceed their target goals now, none are expected to after ten years. However, all the categories are expected to remain above their target minimum.

Gap Analysis by Funding Category

Category	Measure	Minimum Target	Goal Target	Current Level	10-Year Projected Level
State Highway System	SCI	3.55	3.90	4.19	3.72
Interstate	SCI	3.80	4.20	4.27	3.95
Major Arterial	SCI	3.70	4.00	4.23	3.81
Minor Arterial	SCI	3.20	3.80	4.22	3.64
State Secondary	SCI	3.00	3.60	3.97	3.38
State Urban	SCI	3.60	4.10	4.01	3.70
State Municipal	SCI	3.55	3.9	3.82	3.68

Table 7-1

An additional gap analysis, shown in Table 7-2, was conducted on pavements on the Interstate and non-Interstate NHS based on the performance targets as mandated by 23 CFR Part 490 National Performance Management Measures.

This analysis shows the federal pavement performance measure target levels can be achieved with the anticipated funding.

Gap Analysis by Mandated Performance Measures

Category	Measure	Current Level	2-Year Level	4-Year Level	2-Year Target	4-Year Target
Interstate	% in Good Condition	73.2	N/A	80.5	N/A	> 62.6
Interstate	% in Poor Condition	0.0	N/A	0.0	N/A	< 2.4
Non-Interstate NHS	% in Good Condition	53.2	68.5	74.9	> 41.5	> 41.5
Non-Interstate NHS	% in Poor Condition	0.8	0.8	0.8	< 1.5	< 1.5

Table 7-2

The SDDOT rates structure condition according to the good, fair, and poor ratings required for National Bridge Inventory reporting. As shown in Table 7-3, 97.4% of structures on the state highway system are now in the good or fair categories, exceeding

the 95% target goal. With planned levels of investment, 96.7% of structures are expected to be in the good or fair condition ten years from now.

Structure Performance Gap Analysis

Category	Measure	Goal Target	Current Level	10-Year Projected Level
State Network Structures	% of Structures in Good or Fair Condition	>95%	97.4%	96.7%

Table 7-3

A second gap analysis was conducted on NHS structures based on the performance targets as mandated by 23 CFR Part 490 National Performance Management Measures and is shown in Table 7-4. This analysis shows the target levels can be achieved with the anticipated funding.

Structure Condition Distribution

Category	Measure	Current Level	2-Year Level	4-Year Level	2-Year Target	4-Year Target
National Highway System (NHS)	Structures in good condition as a percentage of deck area	27.6	25.0	24.0	≥ 22	≥ 20
National Highway System (NHS)	Structures in poor condition as a percentage of deck area	2.8	3.0	2.65	≤ 5	≤ 5
National Highway System (NHS)	Structures considered structurally deficient as a percentage of deck area	2.8	3.0	2.65	<10% for 3 consecutive years	

Table 7-4

Clusters of pavements and structures built and consequently reaching the end of their lives at the same time can limit the SDDOT's ability to consistently meet state or federal targets. The department intentionally extends the service life of some assets to avoid funding demand peaks arising from structures built during the Interstate era and pavements rehabilitated under the 2009 American Recovery and Reinvestment Act, for example.

Federal Pavement Performance Measures

The passage of Moving Ahead for Progress in the 21st Century Act (MAP-21), the Fixing America's Surface Transportation Act (FAST Act), and the subsequent federal rules created a requirement for states to evaluate and report the condition of their pavements according to a prescribed rating system. The federal requirements were very similar to data the department has collected for years to gather pavement data and make investment decisions.

The department's pavement management practices described in this chapter and in previous chapters have matured over decades of use. These established procedures are the primary basis for decisions regarding pavement improvements. However, the federally mandated system of performance measures can have a substantial impact on federal funding and the available uses of that funding. For those reasons, the federally mandated system is described here as required by federal law and is considered by the department in pavement management decisions.

The federal system uses rutting, faulting, International Roughness Index (IRI), and cracking percentage to categorize tenth-mile segments into good, fair, and poor overall conditions. The measure is reported for the Interstate and non-Interstate NHS in percentage of lane miles in good and poor condition. 2018 is the first year these measures were collected and reported as shown in Table 7-5.

2018 Federal Pavement Performance Measures

Category	% Good	% Poor
Interstate	73.2	0
Non-Interstate NHS	53.2	0.8

Includes non-state-owned NHS

Table 7-5

Federal Structure Performance Measures

Federal rules require states to report structure condition with prescribed measures. These measures are like the established procedures the department has recently adopted, except they pertain only to structures on the NHS and are calculated by percentage of bridge deck area rather than the number or percentage of structures. Due to the potential impacts these three measures (percent good, percent poor, and percent structurally deficient) have on federal funding and the use of federal funding, they are considered in structure management decisions. Table 7-6 shows overall condition of NHS structures from 2015 through 2019.

Overall Condition of NHS Structures by Percentage of Deck Area

Year	Good	Poor		Structurally Deficient
2015	28.0%	3.3%		3.3%
2016	25.8%	3.3%		3.5%
2017	25.8%	1.5%		1.5%
2018	27.2%	1.3%		1.3%
2019	27.6%	2.8%		2.8%

Includes non-state-owned NHS

In accordance with 23 CFR Part 490.411 National Performance Management Measures, NBI culverts are included

Table 7-6

Federal System Reliability Performance Targets

The SDDOT relies on the Regional Integrated Transportation Information System (RITIS) tool developed by the Center for Advanced Transportation Technology (CATT) Laboratory at the University of Maryland to monitor network congestion and meet the mandatory performance management reporting requirements for congestion on the National Highway System. In accordance to the law, the SDDOT has set performance targets for the three required measures, Interstate Reliability, Non-Interstate NHS Reliability, and the Interstate Truck Reliability Index, as defined in 23 CFR 490 National Performance Management Measures, Subpart E and Subpart F. Table 7-7 shows these target values and the actual values over the past eight years.

Travel Time Reliability on the Interstate and NHS

Year	Interstate Reliability %	Non-Interstate NHS Reliability %	Interstate Truck Reliability Index
2012	100.0	100.0	1.19
2013	100.0	100.0	1.22
2014	100.0	99.0	1.23
2015	99.9	98.4	1.16
2016	99.9	97.2	1.17
2017	99.8	94.5	1.14
2018	100.0	93.7	1.16
2019	99.9	92.8	1.19

Source: RITIS

Table 7-7

These ratings show South Dakota has minimal recurring congestion on the state's NHS highways. However, winter weather can have a large impact on travel time reliability due to the reduced speeds. This is one of the reasons why snow and ice removal is a major focus of the SDDOT's maintenance forces.